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No. 2.

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C. H. PIERARD, DEL.



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NOTES FROM THE MINES.

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OTAGO GOLDFIELDS.

MOUNT IDA DISTRICT.

MINING operations in this portion of the colony are chiefly associated with alluvial ground, although a certain amount of quartz-mining is carried on by parties of miners at Nenthorn and Dunback, and by the Mount Highley Company. Several of the claims at Nenthorn have been lately surrendered, owing to the failure of negotiations for floating them in the Home market. During the past six or seven months four new elevating plants have been added to those already in existence in this district, the scene of operations being Main and Enterprise Gullies, and a company has been registered to work Messrs. Guffie and Company's claims in Main Gully by dredging machinery, the plant for which has been ordered, and will be on the ground in February. With one or two exceptions, notably Mr. John Ewing's claim at St. Bathans, the works carried on are not on a scale of very great magnitude. The method of working is by hydraulic elevators, a good water-supply being the most important factor; but the present sources of supply—the Government race and several private races—are altogether inadequate for the needs of the district. During the winter there were enforced periods of idleness owing to all sources of supply being frozen in, and this is the case at the present time. Work has been suspended for the past six or seven weeks, with no present prospect of an early revival. A dredge has been operating on the Fillyburn, near Hyde, but so far without any great measure of success.

Matakanui.

Six sluicing-claims are at work at Matakanui, employing forty men, the largest number (twelve) being engaged by the Undaunted Gold-mining Company, into which the Mountain Race Company is now merged. At Ewing and McConnochie's there are nine men at work; Matakanui Water-race Company,

eight; Sugar-pot Company, six; Sim and Morgan's Claim, four; and Sheenan and Barron's, two. These claims can only work seven months in the year, owing to the water-supply being insufficient. The ground in the locality is pretty rich, and if the whole of the claims were consolidated into one strong company under professional management, and a comprehensive water scheme taken in hand, they could be advantageously developed in respect to prospecting and ultimate working, if warranted, of the deep leads.

At Devonshire, a small place about three miles west of Matakanui, there are two small claims, employing four men, and at Drybread, three miles east of Matakanui, there are five small claims at which eight men are engaged.

TUAPEKA DISTRICT.

Blue Spur and Gabriel's Gully.

The ground being operated on by the Blue Spur and Gabriel's Gully Consolidated Company consists of hard concrete wash lying in the form of a trough, one side of which is formed by the main Blue Spur fault, which dips westward at an angle of 23° from the horizontal. The ground is worked in the following manner: A tunnel is driven about 40 ft. from the outside face of the wash, from the end of which short cross-drives are cut. Into the T-shaped chamber so formed a quantity of roburite (sometimes nearly a ton) is charged, the chamber then stowed up, and the charge fired by electricity. This has the effect of loosening the ground, which is afterwards brought down by sluicing, the sluiced stuff being carried away by wash-boxes for convenient distances, and then elevated by hydraulic elevators to wash-boxes at a higher level. By this means excellent opportunities are afforded for gold-saving, as the boxes are of considerable length, and well provided with riffles and other means of saving gold. Forty men are employed at the works and water-races, and every care appears to be taken to assure the safety of the employés. During the year ending the 28th February, 1897,

the company paid in wages £3,951, a decrease of £164 15s. compared with the preceding year. On the other hand, explosives showed an increase of £143, the amount expended being £673. The following figures will give some idea of the work done during the past four years :—

	Number of Hours Sluicing.	Cement worked.	Gold obtained.
No. 1 Division—		Cubic Yards.	Oz.
1893-94 ..	2,179	58,107	567
1894-95 ..	3,534	94,320	1,536
1895-96 ..	4,144	110,658	2,258
1896-97 ..	3,985	106,412	1,743
No. 2 Division—			
1893-94 ..	4,407	103,733	1,598
1894-95 ..	3,815	127,182	2,252
1895-96 ..	3,688	122,810	2,140
1896-87 ..	3,931	122,048	1,780

The falling-off in value of the cement worked last financial year, as compared with the preceding year, is only about 1·8 gr. of gold per cubic yard, but on such a large mass of material—228,461 cubic yards—it means 856 oz., representing £3,382. The year was unprecedentedly dry, and during the month of February only one-tenth of an inch of rain fell. In consequence there was a decrease during the months of December, January, and February of 124 hours' sluicing compared with the corresponding period of the preceding year. In spite of this drawback, however, the company paid 8 per cent. dividends on 8,968 preference shares, amounting to £718, and, on 82,298 ordinary shares, £7,407, leaving a balance of £1,252, £1,000 of which was added to the reserve fund, and £252 carried forward. The average quantity of gold obtained per calendar month in 1895-96 was 366·53 oz., and for 1896-97 293·65 oz., showing a decrease of 72·88 oz.; but from July to October the prolonged winter brought the working of the mine almost to a standstill, while the severe drought which prevailed during the last two months of the company's financial year checked sluicing to a serious extent. The operations of the company have been so successfully carried on during the past few months that the directors have been enabled to declare another dividend of 4½d. per share. Forty men are employed about the claim and water-races.

Waipori.

The Jutland Flat Dredging Company, Waipori, in their annual report, state that since the 4th November, 1895, dredging went on without interruption, except for the necessary overhaul of machinery, and had proved steadily remunerative, enabling the directors to change a debit of £531 into a credit balance of £302, and to pay three dividends to the share-

holders, amounting to £1,125. The following details of the past year's operations are given :—

Dredging wages-time for period ..	6,171 hours.
Actual lifting during same ..	5,678
Estimated quantity of stuff lifted ..	402,919 cubic yards.
Gold obtained ..	1,135 oz. 17 dwt. 5 gr.
Average yield of gold per cubic yard ..	1·35 gr.
Average consumption of coal per week of 144 hours (Kaitangata nuts) ..	11 tons 6 cwt.

Up to the 31st December, 1896, the company expended, since date of registration, £13,492, and paid £4,125 in dividends, while the amount of capital actually paid up in cash was only £4,000. The company paid in wages for the year £1,318, for fuel £682, for renewals and repairs £415, and in connection with litigation with the Berwick farmers £707. The value of the gold obtained during the year was £4,459.

The Upper Waipori Alluvial Gold-dredging Company paid away in wages last year £1,995, for coal £1,182, for dredge renewals £582, for rent of claim £181, and dividends £600, other expenses bringing the total up to £4,819. The value of the gold obtained during the year was £3,605. There was a credit balance of £573 from 1895, but last year ended with a debit balance of £640, owing to the expenses incurred in shifting No. 1 dredge, and the ground above the gorge, from which good results were expected, proving too shallow; but it has since deepened considerably, and there have been better returns. During the month of July the company obtained 124 oz., and in August 157 oz., of gold.

TEVIOT AND DUNSTAN DISTRICTS.

Roxburgh.

There has been a marked increase in mining activity in this district. Twenty-five special claims, embracing an area of 1,132 acres, were applied for at Roxburgh during the year ending the 31st March, 1897. In addition, 225 ordinary applications were dealt with, and 345 miners' rights issued. The revenue received at the Warden's Office was £908.

Although the returns from alluvial claims were not quite up to those of the previous year, the Roxburgh Amalgamated Company have been doing well, and several other sluicing-claims in this locality have reason to be satisfied with the results of their operations; but the United Hercules Company had to go into liquidation, and the property was sold to Mr. John Ewing. Lower down are the Island Block Company, Golden Run (late Island Block Extended), R. Stewart, and R. Kitto and party, and others, whose claims, during the summer months, suffered from the

prevailing shortness of water, which caused a good deal of broken time.

Dredging, generally, has been successful, and some very payable returns have been obtained, although in two or three instances reverses were met with. In some reaches of the river the running drift is almost insurmountable, but where this has not to be contended with the gold obtained clearly indicates that the river is far from being worked out. The Golden Gate, Ettrick, Otago, Pringle and party, and Bennet and party have all done well.

Clyde and Alexandra.

Dredging has been carried on with a great degree of success during the past year, but sluicing operations were a good deal hampered owing to the dry season, and Messrs. Nicholson and party, who were working in rather a large way on the Dunstan commonage, had to cease operations. In this locality a good many men were profitably employed, and also along the banks of the Molyneux, between the two townships, making fair wages, although only the top seams can be worked, owing to the want of fall, and were it not for the excellent supplies of water from the Fraser River it is questionable whether the claims could be made to pay by ordinary sluicing. Several parties who worked at Springvale seemed fairly satisfied with the results.

Nothing of a permanent character resulted from the small rush to the Manorburn a year or two ago, but two or three parties still remain there making a bare living.

At Tucker Hill Jackson, Campbell, and party, after many years of hard work, were compelled to cease operations, owing to the scarcity of water and other causes, but it is thought their ground might be made to pay well if a more reliable supply of water could be depended on.

Several parties are at work in the various gullies and creeks adjoining—such as Conroy's, Blackman's, Aldinga, and the Fraser—and appear to be making wages.

Dredging has made rapid strides, and upon this branch the permanency of the mining industry must to a large extent depend. Great improvements have been effected, and beaches, banks, and flats that could not be approached some years ago are now being operated on with the greatest ease; in fact, there seems but little limit to the ground that can be worked by this method with the improved dredges now constructed. The Manuherikia River, with its adjacent flats, was pegged out from Alexandra to the mouth of the Chatto Creek, a distance of about

eleven miles. The returns from the Manorburn Company's dredge are not made public, but it is understood that operations have been carried on with highly payable results. Several other dredges are in course of construction, and will soon be completed.

In the Molyneux River there is a large number of dredges in active operation, and many of them are doing well. At the Molyneux Hydraulic Company's claim, at Alexandra, which for some considerable time had been unsuccessfully worked by means of hydraulic sluicing, there is now one of the most commodious and efficient dredges on the river. Her length is 95 ft.; breadth of beam, 27 ft. 8 in.; depth, 6 ft. 6 in.; width of well, 5 ft. 6 in.

The Moa dredge has been working a bank claim at Poverty Beach, adjoining the Golden Beach party's ground, with exceedingly good results. Leijon and party, Ngapara, Earnsclough, No. 1, Chicago, Enterprise, and Findlay's two dredges have all done well.

Bald Hill Flat.

Hesson and party, who have the best water-supply, obtained fully an average yield for this year's operations, and Messrs. Ewing, Carroll, Lynch, and Wilkinson were not far below their usual yearly returns. Several parties worked on the side of the range and in Mr. Butler's freehold with satisfactory results.

In quartz-mining fair yields were obtained from White's Reef by Mr Robert Symes. The Excelsior, owned by Mr. F. W. Gray, was placed under offer to a syndicate, who did a good deal of prospecting, but eventually knocked off, although it is said the prospects obtained at the time were considered sufficient to warrant a continuance of the work.

KAWARAU AND WAKATIPU DISTRICTS.

Cromwell.

There has been a great revival in dredging, and nearly every part of the Kawarau River has been taken up. The Electric No. 2 dredge is still on good gold near Cromwell, and No. 1 is securing fair returns. Timber is being placed on the ground for Electric No. 3 dredge, also for the Magnetic Company's dredge, and for the Victoria dredge, at the junction of the Nevis and Kawarau Rivers. The Hartley and Riley Beach Company are commencing to bring timber on to the ground for their dredge at the Molyneux. The Nevis Dredging Company are starting, after being closed down for the winter, and the Ngapara dredge is being built for the Nevis. McLay's dredge, on the Clutha, has barely paid working-expenses, and Crookston's has met with so little

success that the owners have left the claim and gone prospecting: it is said that the dredge will be brought down the river and put on a claim below Cromwell.

As showing how one industry favourably reacts upon another, it may be noted that, owing to the increased activity displayed in dredging, several coal licenses have been taken out at the Lindis, Kawarau, Bannockburn, and the Nevis, at all of which places coal of fair quality can be obtained and delivered to the various dredges at a reasonable price.

There is nothing special to note in quartz-mining. The tributers at the Cromwell Goldfields Mine, Bendigo, have obtained fairly satisfactory returns. At Bannockburn Lawrence Brothers crushed from the Day Dawn, for the year ending the 31st March, 1897, 310 tons, for a yield of 114 oz. 13 dwt. 7 gr., and 436 tons from the Star of the East yielded 178 oz. 3 dwt. 12 gr. The Star and Oak Mine, which has lain idle for ten or twelve years, has been taken up by Lawrence Brothers, who are putting in a level from the battery on a leader, and expect to get the reef at about 300 ft. Water-power, with a 200 ft. pressure, has been substituted for steam at the batteries, ten heads being employed at the Star of the East and four stamps at the Day Dawn.

McCabe and Sons are driving a tunnel on the Young Australian line of reef, four miles from Bannockburn, and expect to cut the reef at 600 ft. This claim is reported to have yielded good returns at one time, but was abandoned owing to a large influx of water in the shaft. The level now being put in is 90 ft. below the old workings.

Queenstown and Arrow.

The returns from alluvial mining during the past year were somewhat in excess of the preceding year. The only company engaged in sluicing operations is the Moonlight, who have still a lot of virgin ground ahead of present workings. The washing-up for the year proved very satisfactory, and enabled substantial dividends to be paid. The Sew Hoy and Sandhills were the only companies engaged in dredging; their operations have not turned out as well as expected, and these companies are to be wound up. Several other dredging-claims have been lately applied for.

No new ground has been taken up for quartz-mining, that important branch being still confined to the Achilles (late Phoenix), at Bullendale, Skipper's; and the Glenrock Consolidated and the Westralia and New Zealand Gold Explorers (late Tipperary Company), at Macetown. The Achilles are working on a good lode which shows no signs of pinch-

ing out. The Glenrock are breaking down stone that gives a fair average return, but the extent of the lode has yet to be determined. The Westralia and New Zealand Gold Explorers have managed to get sufficient gold to pay a little more than expenses.

Achilles Mine.—This property is situated at Bullendale, Skipper's, on the western slopes of Mount Aurum, about 2,800 ft. above sea-level. This was the property for many years of Messrs. G. and F. Bullen, who bought it about thirty years ago, and expended a large amount of money in developing the mine. They were amongst the first mine-owners in the world to introduce electrical power in connection with a quartz-crushing battery, apparatus capable of delivering 30-horse power at a distance of two or three miles from the generators or dynamos having been erected many years ago, at a cost of £4,000 to £5,000. Up to the 31st March, 1895, the quantity of gold obtained from this mine was 28,096 oz., valued at over £100,000, the average of the crushings being 18 dwt. per ton. The Achilles Goldfields (Limited) took over the property in March, 1893, and a good deal of development work was put in hand, six levels, about 900 ft. apart, having been opened out, resulting in increased yields. For the six months ending the 30th June, 1897, the company crushed 4,079 tons of quartz, for a yield of 4,249 oz. of retorted gold. There is a thirty-stamp mill, and sixty to seventy men find employment in the mine and at surface works.

Premier Mine.—This property is owned by the Glenrock Consolidated (Limited), London. The gold in this mine occurs in shoots of quartz, the lode being in mica-schist quartz rock. There are thirty stamps available for crushing, and four cyanide vats capable of daily treating 5 tons of concentrates. Hauling is done by electric-power, obtained off the mill shaft, and transmitted 830 yards to a motor, which is 530 yards from the mouth of the tunnel.

The Westralia and New Zealand Gold Explorers (Limited) took over the Tipperary Mine at Macetown. The reef is in mica-schist rock, the lode averaging about 4 ft. in width; but the gold only occurs in narrow shoots or blocks of quartz. About 500 ft. below the outcrop a cross-cut adit-level has been put in about 2,000 ft. There are still 1,000 tons of quartz unstopped above the adit-level, and preparations are going on for sinking below the level. Two new water-races have been cut; the old stamps and discs at the battery have been replaced with new and heavier ones; a reverberatory roasting-furnace, capable of treating 1 ton of ore per day, has been erected; and a small cyanide plant, with a capacity of 5 tons a week, has been added. Treatment of

the pyritical sand did not at first prove a success, but after various experiments the manager (Mr. W. J. Stanford) feels confident that, by a combination of cyanide and amalgamation, he can now save nearly all the gold.

The Invincible Mine, at Rees Valley, Lake Wakatipu, work at which was discontinued some years ago, was taken up by the Invincible Goldfields Syndicate, who put on six men to develop the mine, and erected a cyanide plant to treat the tailings which had accumulated in former years.

Pembroke and Cardrona.

The only new development in this district during the past six months has been a hydraulic-sluicing claim opened in the Matatapu River by the Matatapu Hydraulic Elevating and Sluicing Company (Limited). The plant has only just been completed, and owing to the hard frost they are at present unable to work.

The New El Dorado Sluicing Company, at Fatboys, were at work during the summer putting in a prospecting tunnel, but without success. It is only during the summer months that work can be done at Fatboys and Criffel, and on the latter there are only two small private parties at work, and very little gold is being got, all the large claims having been worked out some time ago.

There are a good many small claims worked at Cardrona, but there is very little doing, wages being hardly made by any of them. The Cardrona Hydraulic Company's race and plant have been sold for £255 to Mr. A. Lafranchi, an enterprising man, who is likely to use it to advantage. Miners are looking forward to the working of this and other hydraulic claims, and to the starting of dredges on their leases, so that work can be obtained without having to leave their homes.

At Branch Creek, Cardrona, two sluicing-claims are worked by private parties, and fair returns are said to be obtained from them.

SOUTHLAND DISTRICT.

Parrawa.

The Parrawa Water-supply and Gold-mining Company (Limited) have taken up a claim about three miles from Parrawa, on the banks of the Mataura River, which is to be worked by hydraulic sluicing. Water is brought by a race from Fiery Creek, then syphoned across the river and flats in 13 in. diameter pipes.

Waikaia-Nokomai.

The Golden Terrace Hydraulic-sluicing Company have recently started work, their claim being about

thirty miles from Waikaia and twelve miles down the Mataura River from Parrawa. As far as can be seen the wash is about 150 ft. thick, but it has not yet been bottomed. A well has been sunk 16 ft. below present working bottom, showing the wash to continue below that depth, and to carry good gold. It is proposed to work about 10 acres at a time to the present working bottom, and afterwards work the lower portion by hydraulic elevating below that level. A twenty-head plant has been laid down, and when water is available to the full extent two nozzles are kept going and fourteen men at work, one nozzle and half the number of men being employed when water is not so plentiful. Water is most plentiful in summer, the creeks from which it is taken being fed by melting snow.

The Argyle Hydraulic-sluicing Company (a private concern managed by Mr. Stewart) are working the head of the Argyle Creek by sluicing and hydraulic elevating. The height of lift is 42 ft., and the elevator 10 in. diameter, expanding to 15 in. diameter towards the delivery. Twenty-four Government heads of water are brought in under a pressure of 300 ft., equal to 130 lb. per square inch. The washdirt is about 26 ft. thick, the gold, which is about the size of linseed, being easily saved, and worth £3 17s. 6d. per ounce. Nine men are employed, divided over three shifts. The same proprietors have a sluicing-claim on the terraces, about 200 ft. above the level of their elevating plant. The wash here is 140 ft. thick; one nozzle at work, and five men employed. The returns are very satisfactory.

Kennedy and party, consisting of four, have an area of 4 acres at Murphy's Hill, Winding Creek, Waikaia. The washdirt is from 60 ft. to 100 ft. thick, and from 6 ft. to 7 ft. is worked out by driving next the bed-rock. This averages from 2½ dwt. to 3 dwt. per cubic yard. The stuff is all trucked to the outside and washed there, the party having a race of about three miles in length from Winding Creek, which carries twelve heads of water. The workings are in good order, and timbering carefully done. The claim is half a mile beyond the old working-face of the Break-'em-All Claim. The ground above that being now taken out would not pay for driving in, but will, no doubt, be eventually worked by hydraulic sluicing.

The "*Break-'em-All*" Claim (Waikaia Freehold Gold-mining Company) comprises 50 acres freehold, 30 acres leasehold, and 28 acres tailings area and ordinary claims. The ground is too deep for ordinary sluicing—that is, in respect to getting rid of the tailings. An ordinary dredge-pattern eleva-

tor was put on about the year 1880, but proved a failure, owing to the insufficient water-supply with which to work it, and the claim has been practically idle for fifteen or sixteen years, with the exception of intermittent hand-working on a small scale. It has recently been taken up by the Otago Syndicate (Limited), who propose working by hydraulic elevators, the construction of the necessary works in connection with the water-supply being let by tender. It is stated that fifty heads of water are to be brought in, and that a large amount of capital is to be expended.

Orepuki.

This district maintains its reputation as a gold-producing centre, and, although the past year has been a very dry one, the miners appear to be satisfied with the results. Some months ago there was a small rush to the west of the mouth of the Waiau River, where a lead was found running parallel to the coast at a short distance from the beach. Although not yet sufficiently tried to prove its richness, the indications are encouraging, but water will have to be brought a considerable distance to properly work the lead, which is, however, rather limited in extent, and has all been taken up. The mining population of this district has increased; there are now 150 Europeans and eight Chinese at work, and to the west of the Waiau there are thirty miners, all Europeans.

Round Hill.

The interesting feature of this district is the energetic and successful application of hydraulic sluicing to the low-lying creek-beds and flats. The Round Hill Mining Company completed the enlargement of Port's water-race some time back, and it has now a carrying capacity of twenty-seven Government heads of water. The continuation, or next section on to the Cascade Creek, is also completed, and has a carrying capacity of fifteen Government heads. The company are now preparing to go on with the next section of nine miles from the Cascade Creek to Granity Creek, and the bush and scrub have been cleared.

This last section will be commenced with a carrying capacity of ten heads, and at Granity Creek six heads. The other dams, which have been enlarged, have a carrying capacity of thirty-six Government heads. The cost of these works, up to the 31st December, 1896, was £3,736, which sum does not include the ordinary repairs to the races, on which there are four men permanently employed. The dam-site, which, when completed, will have a holding capacity of 24,000,000 gallons, is situated in the Orawera Gorge. The company have purchased a complete outfit, at a

cost of £3,486, and all the piping, connecting-pieces, &c., are made on the works. In addition to this, £3,865 has been spent on about a mile and three-quarters of 13 in., 10 in., and 7 in. steel pipes, electrical plant, sawmill, &c., with the result that there is now treble the efficiency for operations compared with the old plant, and in ordinary weather fully three times the work can be done. Either of the company's elevators will lift—and does lift when fully at work—10,000 tons per week on an average, at the upper paddock, to an elevation of 45 ft., and at the lower paddock 46 ft. 6 in. There are about fifty hands employed on the claims and water-races, and there was paid in wages last year £6,272 16s. 8d.; for local management, salaries, &c., £519 4s.; and for ordinary working-expenses, £250. The total expenditure for the year on races, new plant, wages, salaries, &c., was £13,712; but now that a lot of the heavy work has been done the working-expenses are not likely in future to exceed £5,000 per annum. The gold yield was 1,238 oz., worth about £5,000. This was all from one elevator, as the new plant was not ready soon enough to get the benefit of the good water-supply. The faces of the claims give fairly satisfactory prospects, and the company will probably soon recover a considerable portion of the money expended. The gold-saving tables are very large, being 1,200 ft. each, including the area covered by matting, angle-iron, ripples, plates, &c.

Another company hold a claim of 20 acres in the same creek, and the shareholders, who are all local men, are hopeful of obtaining good returns for the money expended.

The country towards the Round Hill Mining Company's special claim is all more or less auriferous, and may yet be worked by hydraulic elevators. The European mining population in the district has increased to eighty, while there are only sixty Chinese, a decrease of 50 per cent. compared with the previous year.

Longwood.

Rich quartz specimens have been found in the past in considerable numbers over a small area on this range, and practical miners aver that there must be a rich reef in the locality. A lot of money has been spent in searching for the reef, but so far without success.

Wyndham.

Mining is on the down grade in this district. The special claims granted for beach mining were not taken up, and the number of miners working dwindled from thirty-six to twelve.

Preservation Inlet.

This is, without doubt, a locality of great possibilities. In no part of the colony is there such a vast extent of known auriferous country so little prospected: with the exception of a slight fringe on the coast it is almost wholly unexplored. The track which the Government have decided to make from the Waiau to Preservation Inlet will tend to make the district more accessible and encourage prospecting in the interior, where many practical miners anticipate that alluvial deposits will be found of greater extent and permanency than those worked on the coast-line or near it.

The Morning Star Mine, at Long Beach, is still yielding very satisfactory results. Since it started crushing in August, 1895, up to the 31st August, 1897, the yield of gold from 6,108 tons was 7,345 oz., valued at £29,850. Eleven dividends, amounting to £9,300, have been declared, being at the rate of 7s. 9d. per share. The gold from the district is of superior quality, all sent from the Morning Star assaying over 23 carats at the Melbourne Mint. The number of men employed on this claim, including those cutting timber, is about sixty.

During the past year a large number of claims were taken up in the neighbourhood of the Morning Star Mine, and a good deal of prospecting was done. It is probable that there are parallel lines of gold-bearing reefs to the Morning Star line, for a gold-bearing reef has been traced to the east through the Last Chance and Geelong Extended Claims. Syndicates have taken up the abandoned Break-of-Day, Surprise, Hesperides, and Triangle Claims, and are prospecting them.

On the Chatterton, one of the northern claims in the Wilson River, a contract has been let for an adit level, which is now in about 80 ft., and the owners seem very hopeful of striking the reef that yielded such good returns from the Golden Site Mine.

On the west of the Morning Star line the owners of the Jessica and Winifred Claims have put in a drive about 60 ft. in the former claim, and have got what appears to be a well-defined reef with true walls, assays at the Dunedin School of Mines showing payable results. This reef is believed to extend through Coal Island, as the owners of two claims taken up there report that they have followed a gold-bearing galena reef for some distance in their claims.

At Te Whara Beach a claim has been taken up and a drive put in on a reef traced from the water's edge for 45 ft., and it is stated that good results were obtained from the mortar.

Owing chiefly to the reports furnished to the Go-

vernment by Mr. A. McKay, Government Geologist, in 1896, an Invercargill syndicate sent out a prospecting party, and, following that gentleman's description of the country, they have succeeded in tracing what is believed to be the Morning Star line for a distance of nearly three miles to where Mr. McKay spoke of, striking the reef on the lower Wilson River, and also on the track cut by the Government from Puysegur Point towards the Waiau, a drive put in at this point producing stone which, on assay, showed payable gold.

During the year the Golden Site Company applied for and took up four of the adjoining claims that had been abandoned, and, for the purpose of providing further capital, reorganized and merged with the Golden Site Extended Gold-mining Company (Limited), with a capital of £85,000; 57,855 shares have been subscribed. Under the new management the reef has been traced on the surface for about 1,500 ft., and found to contain payable gold. The company are putting down a shaft which, it is expected, at about 250 ft., will cut the solid reef under the Wilson River clear of the adjoining broken country. There are fifteen men employed, and operations are being proceeded with vigorously.

On several other claims work is steadily going on, so that the prospects of Preservation Inlet as a permanent and payable quartz-reefing district are very encouraging.

WEST COAST GOLDFIELDS.

WESTPORT DISTRICT.

There is a good deal of activity in this district since the advent of the General Exploration Company (Limited), who have acquired five properties—three claims at Four-mile, near Charleston, known as the Empress, Aurora, and Four-mile; one at Addison's Flat, known as the Bendigo; and one at Mount Rochfort, about nine miles from Westport. The water of Lake Rochfort is to be utilised for sluicing purposes; an outlet is being cut to lower the water, and three large dams and water-races are in course of construction. In the Four-mile claims, embracing an area of 25 acres, there are large deposits of cement, but the gold is very fine and has a coating of iron, which makes amalgamation rather difficult. As the cement is of low grade, economical working is essential, and experiments have been going on to find out the best method of working it.

At Bradshaw's Terrace Lind and party hold an area of 30 acres. From three-quarters of an acre,

which they ground-sluiced with eight heads of water, they obtained gold to the extent of £550.

The Beaconsfield and St. George properties, at Waimangaroa, have been successfully placed on the London market by Mr. Lempfert. A working capital of £20,000 is to be provided, and the present shareholders are to receive 30,000 shares and a cash bonus.

At Stony Creek, Waimangaroa, a broken quartz reef, 3 ft. to 4 ft. thick, was discovered on the lease of 99 acres 3 roods held by Gardner, Falla, and McKay, and a lode about 20 chains west of No. 1 reef was found, containing what looked like payable quartz.

Addison's Flat.

At Wilson's Lead, Addison's Flat, the Golden Sand Company, who hold a lease of 308 acres, have let contracts for constructing a head-race two miles and a quarter in length, and a reservoir with a capacity of 3,000,000 cubic feet of water, and also for a twenty-stamp mill, each head 500 lb. The cement, which is 8 ft. to 9 ft. thick, is easily crushed, but there are stones inseparably connected with it that must also be put through the battery. The tables will have a spread of 72 ft., and are to be kept up 8 ft., so as to allow of future concentration and treatment of the tailings. The capital for these works has been supplied by an Auckland syndicate.

The whole of the battery and plant for the Golden Sand Company, manufactured at the Despatch Foundry, Greymouth, has been completed and landed in good order at Westport.

P. Sullivan and party of four, who own the Enterprise Claim, at Wilson's Lead, consisting of 100 acres, averaged about £4 a week per man for the year's work. The black sand and pug in this claim are worked by ground-sluicing.

The Venture Gold-mining Company (Limited), who hold a cement claim of 60 acres at Addison's, work with a twelve-stamp battery, driven by an over-shot wheel, and put through about 30 cubic yards per day, the yield being a little over 1 dwt. per yard.

The Garryowen Gold-mining Company (M. Carmody and party of eight) hold 23 acres at Addison's. The party got 450 oz. of gold, averaging £3 19s. per ounce, for their last year's washing-up. The claim is worked by ground-sluicing with fourteen heads of water brought in four miles from the Totara River.

W. Gould and party, who have a licensed holding of 15 acres at Addison's, have driven 250 ft. of a tunnel and erected a new water-balance for the purpose of working the stony lead on the western side of their claim. The face worked is about 16 ft. in

depth, chiefly black sand, with a moderate quantity of stones.

A lease of 10 acres at Piper's Flat is held by John O'Dea and party, who crushed 7,900 tons of cement for 244 oz. 6 dwt. of gold, value £990, for the year ending the 31st March, 1897. The cement, which averages about 10 ft. in depth, is blasted and trucked to the paddock, which holds about 80 tons, and is generally filled in two days. The party work with twelve heads of water, and have a ten-head battery driven by a Pelton wheel, with a pressure of 60 ft.

Charleston.

When it became known that a powerful German syndicate was likely to invest in mining properties in this locality there was a considerable increase in the number of applications for special claims. From June, 1896, to March, 1897, thirty-two applications for special claims of 100 acres were filed at the Mining Registrar's office, but of that number only eight are granted or in process of being granted, the balance having been withdrawn when it was found they were not likely to be disposed of to some advantage to the syndicates or other parties on the look-out for investments. Mining in this district is chiefly confined to cement-crushing. The material consists of sand chiefly, and sometimes of fine gravel cemented together, which forms a hard cement, and is of a rusty colour, due to the oxidation of the iron it contains. This crust varies in thickness from a few inches to several feet. The quality also varies considerably: in some places it is very rich, but in other spots so poor as not to pay for crushing, although in cement a prospect can be obtained anywhere. The batteries in which the cement is crushed generally consist of four heads of 350 lb. or 400 lb. each, the miners forming themselves into small parties for the purchase of the battery. The cement is crushed in a similar manner to quartz, but in a more primitive fashion, and it is probably owing to the careless and inexperienced way in which the batteries are worked that a better percentage of gold is not saved. For a long time it was thought the slimes were useless, and consequently were not saved, but during the last few months it was discovered that they contained nearly as much gold as the tables. All this, of course, has been a dead loss to the batteries for a number of years; but the gold thus lost has, in a great measure, been saved by other parties with "fly-catchers" in the creeks down which the slimes and the tailings were run, and what they did not save was carried out to sea, to be cast up again

on the beaches, where it is secured by the "beach-combers," who, after a heavy sea, sometimes reap a rich harvest. The gold is thrown up on the beach with black sand, which is skimmed off by the "beach-combers" with shovels and run over copper-plates, where most of the gold is held. To show that the chief portion of the gold washed up on the beaches comes from the cement, it may be mentioned that small particles of cemented sand, similar to what is worked in the claims, can be found on the beaches during the process of "beach-combing"; and, further, when some years ago cement-working was in full swing, and a lot of tailings were going down the creeks, the beaches were very rich, but now, when there is not so much doing in cement, the beaches are poorer.

The German syndicate (General Exploration Company, Limited) have three special claims, containing nearly 300 acres, about four miles from Charleston, and it is anticipated they will shortly commence operations on an extensive scale. There are various reports as to the quality of the cement, which the battery will prove in due course.

At the back of Charleston a special claim of 100 acres, lately taken up, is reported to be fairly rich, but the cost of bringing in water to work it will be a serious handicap.

At Fool's Terrace and Brown's Terrace two special claims have been lately applied for. These are regarded as good properties, and the water can be brought on to them at a reasonable cost, but the difficulty of getting rid of the tailings may cause the holders some inconvenience, as if they are run into the Little Totara, which is the natural fall, residents in that locality may object on account of the silting of the river rendering their properties liable to flood. The Big Totara is proclaimed a sludge-channel, but the fall from these two special claims is the wrong way. While the Hon. the Minister of Mines was visiting Westport a deputation from Charleston waited upon him *re* proclaiming the Little Totara a sludge-channel, and the Minister replied to the effect that there would probably be claims for compensation to a greater extent than the county valuations of the properties, and this was the principal thing to stop it. Tenders have been called for 700 ft. of a tunnel in the Lucinda Special Claim at Fool's Terrace.

Lyell.

Mining operations have been steadily carried on in the Alpine Mine, which is the mainstay of the place, but lately without payable results. On the 4th August a meeting of shareholders in the Alpine and

Lyell Creek Companies was held, and it was decided to amalgamate, and carry on operations under the style of "The Alpine Extended Quartz-mining Company (Limited)." There are about thirty men employed in the mine, and two parties of tributers. One of these parties crushed 105 tons of leader stone, which yielded 189 oz. of gold. Operations are being carried on with the view of connecting the lower workings in the Alpine with the Lyell Creek tunnel, which is about 3,700 ft. in length, and when this work is completed the Lyell Creek tunnel will drain the lower workings in the Alpine, and thus save a good deal of labour and expense. Extensive preparations are now going on to connect No. 10 level with the battery by a ground tramway, and thirteen men are engaged on this important work, which it is expected will be completed about the middle of September, when they hope to start the battery and keep it going full time, as they have 150 tons of ore on hand, and have only 45 ft. more to drive north to meet the winze from No. 5 level, which has to be sunk 25 ft. When this is completed the mine should be in an advanced state for development purposes. The reef varies from 2 ft. to 18 ft. in width. The approximate quantity of gold obtained from this mine since registration up to the 31st December, 1896, was 61,307 oz. 8 dwt. 22 gr., value £242,696 10s. 6d. On 32,000 shares in the company dividends amounting to £74,266 10s. 6d., equal to £2 6s. 5d. per share, have been declared. The Alpine battery consists of twenty heads and four 4 ft. 6 in. berdans with drags, and is driven by two Pelton water-wheels. Since the 3rd January to the 18th August, 1897, 3,660 tons, yielding 901 oz. 15 dwt. 15 gr. of gold, were crushed for the company; and for the tributers 252½ tons, which yielded 359 oz. 1 dwt. of gold.

The Dee Creek Company (No Liability) have let tenders for the construction of a water-race (three miles in length), tunnel, and supply of sawn timber in connection with their alluvial special claim of 100 acres, situate between Three-channel Flat and Inangahua Landing, and ere long mining operations will be vigorously carried on there.

The Exchange Dredge (formerly Cocksparrow, which paid £525 in dividends) is at work on the Buller River at Three-channel Flat. It is owned by a party of six, who are working it, and they are on good gold.

The Tyreconnel Claim is held by a party of three, who are the lessees. During the month of July they crushed stone which went about an ounce to the ton.

There are not many alluvial miners in the district, the majority being Chinese, who eke out a living by

working old abandoned ground considered too poor by European miners.

There are no quartz-miners working at Murchison, but there is a fairly large population of alluvial miners, including about sixty Chinese. The Buller dredge is operating on the Buller River, at Fern Flat, and on payable gold, enabling dividends to be paid from time to time. This company have decided to construct a more powerful dredge than the one now at work, and it will shortly be under way. The Matakītaki dredge is about to be dismantled and removed to the Matakītaki River at Murchison, where it will be reconstructed with new hull, &c., and placed on a special claim recently applied for at that place. For the year ending the 31st March, 1897, this dredge got 362 oz. of gold, which sold for £1,391 11s. 3d.

A number of applications for special claims and licensed holdings for sluicing purposes have been applied for at Maruia, and a quantity of mining plant has been conveyed to that district for the purpose of working those claims.

GREY VALLEY AND AHAURA DISTRICTS.

Greymouth.

Several companies are in course of formation for dredging the bed of the Grey River, and it is expected that good yields will result, as nearly all the tributaries of the Grey and the water-courses leading into it come from districts that have in the past yielded large quantities of gold.

A special claim of 100 acres has been applied for on the south side of the Grey River, opposite the Paparoas, where prospectors have been at work for a Hokitika syndicate. It is stated that a well-defined reef, likely to give payable results, has been found.

Barrytown.

Seventy-five tons of plant and material for the Barrytown Flat Gold-mining Company's hydraulic elevators have been landed at Greymouth, and the remainder will shortly be shipped. The elevators are to be worked under a pressure of 600 ft., and the wash treated at the rate of 50 or 60 cubic yards per hour. Works are now in progress for bringing in the water from Baker's Creek: when completed thirty-five heads will be available. A contract has been let to a Greymouth firm for 190,000 ft. of timber for the fluming. The operations of this company will be watched with considerable interest, as there are about 7,000 acres in Barrytown Flat. The track between Greymouth and Barrytown is to be

improved, and the Government will assist to the extent of £100 in blasting some rocks and improving the track.

Moonlight and Blackball.

The capital of the Roaring Meg Sluicing and Hydraulic Power Company (£12,600) has been subscribed by Wellington investors, who intend to import their machinery from San Francisco. To lift the big stones out of the way, which are there in thousands, and have hitherto blocked profitable working, powerful hydraulic cranes are to be procured, and with improved appliances it is confidently expected that the ground will prove remunerative. "It is these terrible stones that have hitherto proved to be the great stumbling-block against working the ground," remarks the *Grey River Argus*, "otherwise the ground is considered to be exceedingly rich. The locality is the most promising in the valley."

Paparoa Ranges.

The Victory Quartz-mine, at Paparoa Ranges, is situated at an altitude of 600 ft. on the north side of the Grey River, about five miles from Brunnerton and thirteen miles from Greymouth. A slip filled in the mouth of No 1 level, but No. 3 level is now connected at a distance of 125 ft., and an uprise is in progress 50 ft. to connect. The quartz, which is easily got out and crushed, still holds good, the reef being about 6 in. to 18 in., but not well defined. The gold is of a coarse, rough nature. Six men are employed by Curtis Brothers, the owners.

The Julian Claim, which adjoins the Victory, is at an altitude of 800 ft. Prospecting is going on. Two men are stripping a lead of quartz in dry weather, and working inside when it is wet. There are about 40 tons of stone in the paddock, and there is a block of quartz in sight, about 6 in. thick, but no visible gold in it. The first crushing produced gold to the value of £56, the assay-value from Vivian's reef being £3 19s. 11d., and from No. 2 winze £4 1s. 3d. A large number of claims have been pegged off, and when the fine weather sets in the Paparoa Ranges are likely to be extensively prospected.

INANGAHUA DISTRICT.

Crushington.

Keep-it-Dark.—Since the last report No. 7 level, from the bottom of the winding-shaft, has been connected with the winze which had been sunk on the reef from No. 6 level. 30 ft. has been driven on the lode on No. 7 level, and so far the stone is of low

grade and not very solid, being intermixed with bands of mullock; but better results may be expected when the reef has been driven on further. A strong body of stone still continues above No. 5 level, and, judging from the way it is extending north as it goes up, it would appear not to have any connection with any of the lodes previously worked on the levels above No. 5. During August 100 ft. of the winding-shaft has been retimbered.

No. 2 Keep-it-Dark.—Nothing payable having been found by extending the level and prospecting on the line of reef, it has been decided to abandon the old line. A cross-cut is being driven west from No. 3 level, and the drive is at present in about 30 ft.

Hercules.—Since the last report the cross-cut east on No. 9 level has been extended 248 ft., making a total distance of 408 ft. At different places along this drive the country was of a most promising nature, with leaders of quartz intermixed with the slate, but no defined track was intersected. This drive is still being continued.

Wealth of Nations.—Fair progress is being made in this mine, 509 ft. of driving having been completed since last report. Thirty-six men are employed making preparations for carrying down a shaft on the strike of the lode below battery-level. This underlie shaft will have to be sunk 640 ft. to reach the lowest level, and the connection should be made in about three months. There will then be a large quantity of ore to operate on. A boiler and air-compressor are now being erected to work this new incline-shaft.

Murray Creek.

Inangahua Low-level Tunnel.—This tunnel has been extended a further distance of 700 ft. since last report, the face being now in 4,689 ft. Twenty men are employed driving a cross-cut, and they expect to cut the strike of the lode any day.

The winze in the Golden Fleece to connect with this tunnel has been sunk a further depth of 181 ft., making the total depth 326 ft. Twelve men are employed at this work.

Boatman's.

Welcome.—The reef found on No. 5 level still continues small. The level has been driven on 166 ft., and an uprise of 108 ft. put up. No 9 level has been driven on for a distance of 299 ft.

Devil's Creek.

Progress Mines.—Since last report development works have been steadily carried on, 1,579 ft. of

cross-cutting and driving having been accomplished. The new B shaft (known as the "Globe B shaft"), which started with twelve men on the 9th November, 1896, was down 945 ft. by the 21st August, 1897, from which must be deducted four weeks' lost time—viz., a fortnight during the Christmas holidays and a fortnight through a slip at the hoisting site. This, it is thought, breaks the record in shaft-sinking either in New Zealand or Australia. It will not be sunk further until the new winding machinery, which is now being delivered on the ground, is erected. The total cost of the shaft, which is timbered right through in a most reliable manner, is £4,394 6s. 2d. A chamber has been cut at the bottom of the shaft, and a start has been made to drive the tunnel to open up No. 7 level and connect the Globe and Progress workings. No. 6 level has been connected with this shaft. Crushing at the old battery will take place at an early date, so as to give more storage-room till the new mill is ready; this will take about three months to complete. It is estimated that the company have a three years' supply of quartz in sight to keep the new battery going. There are eighty men employed in the mine and at surface works.

Merrijigs.

Sir Francis Drake Syndicate.—This claim comprises ground formerly held by the Sir Francis Drake, Gallant, Scotia, and Happy Valley Companies, containing 100 acres of ground. Since last report the principal work done has been the stoping-out of quartz from Smithy level to the surface. A winze has been sunk from Smithy level 70 ft. to connect with stone which was stoped up 130 ft. from the 200 ft. level. This was for the purpose of ventilation and to facilitate the taking-out of stone still remaining in this block. During the last month four men have been driving for another known block of stone on No. 1 or surface level, which it is expected will shortly be struck. An additional five heads of stampers have been added to the battery, which has now fifteen heads. The result of last crushing was a yield equal to 9 dwt. per ton. Since the formation of the syndicate they have obtained 1,011 oz. 9 dwt. 11 gr. of gold, value £4,040 8s. 7d., from 2,927 tons of quartz, and 19 oz. 6 dwt. of gold, value £77 4s., from 3 tons 4¼ cwt. of concentrates.

Inkerman Combined Mines.—This company are pushing on work in a most expeditious manner. Since starting operations, about ten months ago, sinking has been carried out for some 818 ft. This consists of reopening old workings 417 ft. and sinking 401 ft. in new ground. Driving has been carried out for

4,123 ft., representing old workings reopened 1,323 ft., and driving 2,800 ft. in new ground. In the low-level tunnel, in course of construction with the object of cross-cutting the country lying between Rainy Creek and the new Inkerman shaft, 127 ft. has been driven. On the 8th May last a Rand compressor and rock-drill plant was started at the low-level tunnel from Rainy Creek, since which date 684 ft. of the tunnel has been driven—an average of 42·75 ft. per week. The month of July showed considerable advance on previous distances driven with the rock-drill plant: for the five weeks ended the 31st July a distance of 247 ft. was driven. During August the low-level tunnel was advanced 290 ft. Other development work is being pushed on in contiguous places. Ninety-seven men were employed in the mine during August.

Golden Lead.—The driving of the low-level tunnel is still being proceeded with. The driving has been very hard and the ground full of water, but a change of strata now appears to be coming in. The tunnel, when it reaches the line of the lode, will be 400 ft. perpendicular below former workings. It is now in about 900 ft., and will require to be driven another 450 ft. to reach the line of lode. The line of the A1 Company's leaders should be intersected in about another 150 ft.

Cumberland.—Recent prospecting has not led to any discovery, and operations have of late been confined to the winding level. The shareholders in this and the Exchange and Success Companies, whose properties adjoin, have under consideration a proposal to amalgamate the three companies, and by so doing form one strong company.

Painkiller.

Dillon Extended.—Operations in this mine are wholly confined to the extension of the low-level tunnel in a southerly direction. At the present time the contractors are in very likely country, carrying a well-defined track, with walls 3 ft. apart.

Big River.

Big River.—There are 60 tons of ore at the surface ready for treatment as soon as the improvements to the battery, which consists of ten heads, are completed. A cyanide plant, consisting of six 25-ton vats, two 10-ton sumps, and two zinc-boxes, will shortly be in readiness for a full return every month. The company hold an area of 38 acres, and employ eight men at the mine, six men in improvements to the battery, and thirteen at the cyanide works. The shaft is sunk 730 ft. below No. 1 level, or a distance of over 900 ft. from the surface. The altitude of the brace at the shaft is 2,350 ft.

Victoria Range.

The negotiations for the option of the purchase of the claims of the prospectors at Victoria Range by the Anglo-Continental Syndicate have been recently concluded, and the terms are slightly different to those previously proposed. The terms, as accepted, are as follows: The option will be for a period of twelve months from the 1st October next, from which date the syndicate are to expend not less than £200 per month in prospecting the properties. In the event of the option being exercised, the syndicate will float a company to work the ground. This company will have a capital of £200,000, in 200,000 shares of £1 each. The prospectors are to be paid £16,000 cash, and receive 40,000 fully-paid-up shares. The working capital will be £30,000, and an additional 30,000 shares will be held in reserve to provide further working capital if required.

KUMARA AND HOKITIKA DISTRICTS.

Kumara.

For some time past a good deal of prospecting has been going on in the neighbourhood of Dillman's, seeking for gold on a lower level than what has been treated as "bottom" in sluicing, and some payable ground has been discovered at a lower level—too low, however, to admit of the ground being sluiced. Several parties are putting in tunnels fronting the Teremakau River, and the following are now on gold, averaging from 1½ dwt. to 3 dwt. to the load, though so far only one claim has got as high as 3 dwt.: Reid and party, Goad and party, McNeill and party, Burger and party, Dennett and party, Holst and party, Flaherty and party, Gibbons and party, Warren and party, Moynihan and party. Berdinner and party and Richards and party are not yet in with their tunnels. Besides these, a number of claims have been marked off, embracing an area of about 20 acres. The ground, so far as proved, does not give high yields—it is merely "wages ground": the height of the wash varies from 5 ft. to 8 ft., and the distance driven from 2½ to 6 chains. This new find is regarded as an important one, as the gold is found on a level 125 ft. lower than the bottom of the sluicing-claims previously worked on this field.

At the Government Loop-line Dam, which is used as a storage-basin for the Kumara Race, the water has been raised 18 in. higher than former level, and the water now covers an area of more than 300 acres. The increased capacity may fairly be stated at 20,000,000 cubic feet of water, or between five and

six days' full supply more than hitherto for the Kumara field.

Hokitika.

The returns from some of the claims at South Hokitika have been very good. Johnston and party, Purnell and party, and others are doing well, the former having cleared about £200 for three weeks' work with four men. Craig's tributers are reported to have struck a rich patch, which yields good dividends to the tributers and the owner of the ground.

A company has been formed in London to work the Waiho Company's claim of 150 acres at the Waiho. Water will be obtained from the Waiho, and owing to the broken nature of the country it will be conveyed almost entirely by iron pipes, the pipe-line being about two miles in length.

Humphrey's Gully.—A survey-line is being pushed forward for a new water-race. The present water-race carries about thirty heads of water, or, after counting losses on pipes and otherwise, about twenty heads pass through the nozzles, two of which are at work. Nine men are employed, three on the claim and six prospecting.

Ross.

There are twelve men working on tribute at the Ross United. The face of the workings is sluiced and run in boxes, to be lifted by the elevators, then emptied into trucks and wound up by machinery driven by a Pelton water-wheel, and afterwards run out and put over the western bank.

At the Prince of Wales Claim, where nine men are working on tribute, there are three faces going 20 ft. wide, averaging 10 ft. to 12 ft. in length.

James Sharp and party are working a face on the same principle as the Prince of Wales Claim, and coming up behind them with another face. Their wash-drift is sent up another incline on the opposite side of the claim.

Mont d'Or.—There are twenty-four men working on this company's ground, but operations have been greatly retarded owing to the want of water. Since the registration of this company, on the 25th July, 1882, the quantity of gold obtained up to the 31st December, 1896, was 19,658 oz. 2 dwt. 2 gr.; value, £74,067 19s. 10d. Prior to registration the old company obtained nearly 4,000 oz., the value of which was £15,200, and the Greenland Company got 7,082 oz. 5 dwt. 4 gr.; value, £27,620 16s. Thus the total quantity of gold got by the three companies operating on this ground was 30,740 oz. 7 dwt. 16 gr., of the value of £116,888 15s. 10d.

The owners of the Alpha quartz claim at Cedar Creek (D. Manara and Son) intend to erect a battery, at a cost of £350. A low-level tunnel, driven a distance of 173 ft., crosses the reef at 43 ft., and a winze, 26 ft. in depth, is sunk on the reef. The face is standing on a leader, driven off a few feet on both sides. The high level is running with the reef, which is about 3 ft. thick between the walls. There are about 20 tons of quartz in the paddock outside the drive. Mr. Link, of the New Zealand Exploration Company, has visited this mine, and it is understood that negotiations are in progress for floating the property in London.

HAURAKI GOLDFIELDS.

THAMES DISTRICT.

Thames.

New Alburnia.—This company are pushing on with the development of their mine, and to all appearances the works in progress are of a reasonable character. A fair supply of good crushing material is being obtained from Dixon's reef and the branch leaders striking away from it at both No. 4 and No. 5 levels. At the latter level the old drive on the Sons of Freedom reef is being opened up, and good progress made with the work. When this is accomplished it is expected that a large quantity of ore will be available from this reef, which should well repay the outlay. The main shaft is also being sunk from No. 5 level for the purpose of opening up a new block, which may be considered virgin ground. One thousand tons of low-grade ore is being put through the battery as a test.

May Queen.—This company have enlarged and re-timbered the Queen of the May shaft to a depth of 382 ft., and expect to have it completed to No. 4 level about Christmas time. In the Saxon section a rise is being put up on No. 2 reef from the north cross-cut at No. 6 level, for the purpose of connecting with the drive on the same reef at No. 4 level. When completed the drive will be about 140 ft. The reef is about a foot in thickness, the quartz being of a kindly description, and gold is freely seen in breaking it out. Forty-one men employed underground and four on surface.

Moanataiari.—This company are going to a large amount of expense in opening up the mine and erecting a large crushing plant, with all the modern gold-saving appliances suitable for treating the quartz in this locality. The works in progress in the mine

are confined to opening up the different reefs preparatory to crushing: driving on the Golden Age, Reuben Parr, and other reefs in the upper levels; extending the main tunnel on the Reuben Parr reef for the purpose of getting under the rich run of gold that was obtained in the upper blocks and from the Just-in-Time shaft. No. 2 level is being opened up to further prove the reef in this part of the mine. At No. 3 level driving on No. 1 reef is being pushed on towards the Caledonian boundary, and a cross-cut is being driven to get under the Cambria section of the mine. The sinking of the Just-in-Time shaft is also proceeding. It is to be sunk to the No. 4 level, or what is generally termed the 400 ft. level, of the Big Pump shaft. Eighty-four men are employed in the mine, and twenty-three on the surface at various works.

Kuranui-Caledonian.—This company are pushing on vigorously with the opening-up of their mine. At No. 4 level driving is proceeding on No. 1 Caledonian reef towards the Moanataiari boundary. There is a large well-defined body of quartz in this drive fully 5 ft. in thickness, and, as this is a good locality, something of importance may be met with at any time. On the cross-reef a winze is being sunk for the intermediate below No. 2 level to No. 3. The lead is small, but, as rich blocks were taken out over this place, it is fully expected that a payable block of ground will be opened up here. Driving and stoping are proceeding on what are known as Kelly's leaders, in the Kuranui section of the mine. At No. 1 level the main lead is about 1 ft. in thickness, but in places there are several small leaders striking from the main one which are carrying good gold; this is all being broken out and sent to the battery for crushing. Picked stone is also frequently obtained in breaking out the quartz in these leaders. There is a large block of unprospected ground here, and so far the prospects met with are better than at first anticipated. A fair amount of ore is still being obtained from Darby's lead, which is shaping for a payable return.

Tararu.

Tararu Creek.—This company's operations are chiefly confined to rising, driving, and stoping on the City of Dunedin reef at their low level. The reef averages 8 ft. in thickness, the whole of which is sent to the battery for crushing. Although it is low-grade ore, and yielding only 8 dwt. to 10 dwt. per ton, the manager is confident, when the battery level is in to connect with these workings, that the lode will prove remunerative.

Puriri.

Puriri Gold Estates.—This company has been recently formed in London for the purpose of acquiring the Te Rako-o-Taranga freehold block and the Inverness, Gwendoline, and Beresford Special Claims, the total area comprising about 200 acres. Mr. George Stephenson, the company's representative, is now arranging for the thorough development of the property and the erection of a battery and cyanide plant.

Empress of India.—A considerable amount of work has been done at this mine. The low level has been driven 400 ft., 300 ft. being on the reef. No. 1 level is in 210 ft.; No. 3, 50 ft.; and No. 4, 340 ft. Twelve men are employed.

Hit or Miss.—The intermediate level is in 400 ft. in hard shooting country, and the low level 160 ft. through the same class of country. Ten men are employed. This property is being developed on behalf of the London and New Zealand Exploration Company.

Tapu.

Mahara Royal.—The mine is well opened up, and a considerable quantity of quartz is stacked waiting the construction of the tramway to connect the mine with the battery. Forty-four men are employed in the mine and battery works.

Eleven men are employed sinking winze and stoping at the Golden Point, and eighteen men are engaged in retimbering at the Sheridan.

Whangamata.

Whangamata Proprietary.—The main lode, which is of large dimensions, has been opened up for a length of 1,000 ft., and about 3,000 tons of payable ore have been paddocked. A commencement has been made with the construction of the water-race for the battery. Forty men are employed on the property.

OHINEMURI DISTRICT.

Karangahake.

New Zealand Crown Mines.—The whole of the crushing plant has now been altered from dry- to wet-crushing, and the superintendent of the company's mine and reduction-works (Mr. Daws) is reported to be well satisfied with the results. It is claimed that the crushing-power of each stamp is considerably increased, and that the percentage of extraction is greater, while the kilns can be dispensed with, the dust nuisance abated, and a considerable saving in labour and firewood effected. Good progress is being made with the new water-race, the bottom boards of

which are laid the whole way, a distance of a mile and a half. The company contemplate adding forty additional stamps to their battery, making eighty in all. The mine is turning out ore of excellent quality, the last yield being 2,394 oz. of bullion, value £4,163, from 1,567 tons.

Woodstock.—This company have an excellent gold-saving plant, and a Gates ore-crusher has been recently added. The mine is well opened up, and produces ample quartz to keep the stamps constantly going. There are about two hundred men employed at the mine, battery, and general surface-works. Some of the richest stone yet found in this property has been lately broken from the lode at the bottom of the winze connecting the Nos. 4 and 5 levels, which is regarded as an indication that the runs of gold now being worked have carried down continuously from the upper levels, and are likely to continue to a much greater depth. The last crushing from low-grade ore gave a return of 5,417 oz. 5 dwt., value £2,758 19s. 5d., from 1,015 tons.

New Zealand Talisman.—The new plant is working smoothly, and everything in connection with the mine is being carried out in a complete manner. The first crushing gave the satisfactory return of 4,632 oz. 8 dwt. of bullion, value £3,915, from 1,008 tons of ore, or at the rate of nearly £4 per ton. The size of the reef averages about 2 ft. 9 in. Forty-three men are employed in driving and stoping the various levels, which are well opened up and ventilated. It has been found that No. 3 level is intact to the surface, which will give about 80 ft. of backs to work on.

Woodstock Main Reefs.—This company's property is situated on the north side of the Ohinemuri River, opposite the Woodstock battery. The claim is under partial protection, the Warden having granted permission to work with fourteen men, but at present twenty-five men are employed in surface prospecting and putting in three drives at different levels, but so far nothing payable has been discovered.

Waihi.

Waihi.—The returns from this mine continue with unabated regularity, the returns for July and August being :—

Tons.	Bullion. Oz.	Value. £ s. d.
3,120	11,512	11,667 15 3
3,120	11,315	11,757 1 10

Up to the 31st August, 1897, this mine has produced bullion to the value of £582,797 5s. Late yields have enabled the directors to declare a dividend of 2s. per share, and previous to this seventeen dividends, amounting to £212,500, were paid by

this company. Experiments have for some time past been made on sulphide ore from the north-eastern section of the mine, by subjecting it to a roasting process before cyanidation, and a reverberatory furnace, capable of roasting 10 to 12 tons per day, is to be added to the battery-works, as the experiments made by the company's metallurgist have proved that a high percentage of bullion can be extracted at a slightly enhanced cost. While these experiments have been going on the ore from the north-eastern section of the mine has been paddocked, and an improvement in the bullion returns is looked for when it can be treated in bulk.

Waihi-Silverton.—This company's property, which contains 73 acres, lies to the eastward of the Waihi, on the other side of the flat. There is a forty-stamp mill about a mile distant, and the ore is trucked from the shaft to the battery. The ore is kiln-dried at the mine, and there are five kilns, each capable of taking 200 tons. The shaft is down 154 ft., and two levels have been put in. The average width of the reef operated on is about 10 ft. There are two reefs traversing the property.

Waihi Consolidated.—This property consists of the Favona, Brilliant, and Martha United Claims. The erection of the new pumping plant, which is capable of lifting 24,000 gallons per hour, having been completed, prospecting work will be undertaken, and two cross-cuts are to be driven to intersect the large ore-bodies met with in the upper levels. It is expected that a better class of ore will be intersected in the lower level, as sandstone country was penetrated during the last 70 ft. The shaft has now attained a depth of 220 ft.

Grand Junction.—What is believed to be a continuation of the famous Martha lode, which has contributed so much to the Waihi yields, has been met with in this mine, causing a great deal of excitement amongst mining investors as well as shareholders. A heavy influx of water has, however, retarded development, the flow from the face being at the rate of 17,000 gallons per hour, while the full capacity of the Worthington pump is only 22,000 gallons, and a large outlay will therefore have to be faced to cope with the water. In the western section of the property a prospecting shaft is being sunk still further west than the old workings, with the view of proving the extent of the lode running through that portion of the property.

Waitekauri.

Waitekauri.—This mine, the parent of the Waitekauri group, maintains its reputation as a steady

bullion-producer, and there has been a marked increase in the yields since the various improvements at the reduction-works were carried out. The returns for August were 3,728 oz. of bullion, value £3,900, from 1,830 tons; for July, 4,689 oz., value £5,462 2s. 1d., from 1,841 tons. New pumping machinery has been erected at the No. 1 shaft, and the pumping and winding machinery for No. 2 shaft, which is distant about 1,200 ft., has been delivered. The ore is conveyed from the mine to the battery (forty-head) at the Waitekauri Township, a distance of five miles, by horse-tramway. There is a complete cyanide plant, and eleven kilns, each capable of drying about 220 tons of ore. Two Pelton wheels supply the motive-power for the battery, but an engine is kept in reserve in case of the water falling short. The large water-wheel drives an incline tram, machinery, saws, &c.

In the Golden Cross section of the property, which is also being steadily developed, there is a ten-head battery and three cyanide vats, the ore being dried at the mouth of the kiln level and trucked to the battery.

Waitekauri Extended.—This property adjoins the Waitekauri and Fiery Cross. The low level is now in about 600 ft. A large body of ore, averaging about 30 ft. in width, is being operated upon, and good results are looked for as soon as the battery is completed. Twenty stampers are nearly ready, and twenty more will be added.

Waitekauri United.—There are forty-five men employed on this property. The main tunnel is in 950 ft., and several small leaders have been intersected. In the No. 2 level, which is intended to connect with No. 1 tunnel on the opposite side of the range, 600 ft. has been driven, and a further distance of 1,500 ft. to 1,600 ft. will require to be driven. Good progress is being made in No. 1 tunnel, the rock-drill, which is driven by compressed air supplied by a 16-horse-power engine, driving at the rate of 100 ft. per month. On the Globe section of the property a lode 6 ft. on the surface has been discovered, and it is intended to continue sinking on the reef.

New Zealand Jubilee.—This property, which lies on the same range as the Waitekauri United, embraces an area of 100 acres, and is held by the Melville Corporation of New Zealand. The low-level cross-cut has been driven a distance of about 1,500 ft., and a good deal of driving has been done on the Waitekauri reef north and south. In the north drive a large body of quartz was met with, though not of a promising character, and in the south drive

there was 5 ft. of solid quartz in the face, similar to what was met with in the north drive. It is contemplated to further develop the property before proceeding with the erection of a battery.

Waitekauri Union.—This company hold two large leases, one on each side of the Waitekauri Cross. A shaft is being sunk on this property by the English syndicate who lately took it over, and preliminary works are in progress for the erection of air-compressors, &c. It was at first intended to open out at 300 ft. and cross-cut both ways, but it has been decided to sink 400 ft., and 600 ft. if a heavy flow of water is not encountered.

Alpha.—This property, which now consists of 97 acres, and embraces the areas held by the Alpha, We Three, and Rainbow, adjoins the Komata Reefs and Te Ao Marama section of the Waitekauri, and it is well situated for economical working. The main reef has been opened out at three different levels, and in the level now being worked a reef has been met with averaging about 4 ft. 6 in. Other reefs have been intersected at various points, one in the Alpha section of the property being about 4 ft. thick. Arrangements have been made for the erection of a twenty-head battery and cyanide plant. A hundred tons of ore are already stacked, and there is a sufficient quantity in sight to keep the battery going a considerable time.

Grafton United.—This company, who hold an area of 226 acres, are hopeful of picking up the Golden Cross line of reef, as it is thought that a reef out-cropping on the hill in this property lies in the same direction as the Cross.

Grace Darling.—The lode has been driven from one side to the other a distance of 800 ft., the lode varying from 4 ft. to 6 ft. in thickness, but owing to the fact of its containing traces of copper and arsenical pyrites the results expected were not realised by the cyanide treatment. There is a ten-head battery, berdans, and two cyanide vats on this property, which is at present under option. Worked on a larger scale, and with a different treatment of the ore, it is thought the mine should give better results than it has done hitherto.

Wharekeraupunga.

Royal Standard Gold-mines.—The low level is now in a distance of 200 ft., and several reefs have been intersected, but they have not yet been opened out. Work at the tunnel is being steadily pushed ahead, and also at the intermediate tunnel to intersect Nos. 1, 2, and 3 reefs on the north side of the river. On the south side No. 2 cross-cut is being driven to

cut the No. 2 reef at a point where a rich shoot of ore was met with on the surface. All the other works in the mine are going on satisfactorily, a tram to connect the timber-pits with the mine has been completed, and good progress is being made with the erection of the machinery.

COROMANDEL DISTRICT.

Coromandel.

Royal Oak.—This company had two splendid returns during the past couple of months. The first, 25 tons of general ore and 1,633 lb. picked stone, produced 1,431 oz. 11 dwt. of melted gold, value £3,500; the second, 9 tons of ore and 2,073 lb. picked stone, gave a return of 1,177 oz. 8 dwt. of bullion, value, £3,000. The property is again fully manned, the greater part of the dead-work development is overcome, and the mines are now being laid out on a permanent reef basis. The future of the property, so far as indications present themselves, bids fair to give the shareholders fair profits. The reef is being stripped at present, and owing to the general hardness of the soil the breakdowns are consequently not very frequent. Gold is still showing in the face.

Success.—The returns resulting from development work during the past two months have more than covered cost incurred, and from present appearances are likely to continue so. The different reefs are well opened up and worked in a systematic manner.

New Hauraki.—A very important development has occurred during the past few days. A reef similar in character to the Success reef has been cut, giving backs of 250 ft. Nothing beyond cutting through the reef has been done, but any breakdown may reveal gold equal to anything met with in the Success. It is practically a series of reef similar to, and about half a mile south of, the Success property. This reef was never before seen or known to exist. The manager thinks he has got it, and only awaits further development to prove the correctness of his opinion. Fifteen men are employed.

Scotty's Hauraki.—This company have practically reconstructed, with a working capital of £20,000. The manager hopes with this amount to prove the ground, which is, in his opinion, practically one of the Hauraki group.

Golden Pah.—The pumping- and winding-engines were run for the first time on the 31st August, giving general satisfaction. A few days previously this company discovered a new reef having the same direction

as Legg's reef in the Hauraki section, bearing north-west with a dip east. A sound and full basis of development is now being adopted, the permanent plant being available for doing so. A small crushing will be taken out in the course of a few days.

Hauraki.—This company are keeping up the returns to 500 oz. every four weeks, and are likely to do so for some time. The manager hopes to have a pair of new engines and equipment ready, to replace the machinery burnt down by the late fire, at work in a few weeks: it is now being carted to the mine. No time will be lost in opening up the deeper levels, when the manager hopes to repeat the golden history of the upper levels.

Kathleen.—This property is now being vigorously exploited, and various reefs are being intersected in the course of the development works in progress.

Kapanga.—A large stream of water has been struck in the cross-cut at the 1,000 ft. During the last 70 ft. of driving on the level a formation containing a little gold has been passed through, and a better class of country is perceptible. The diamond-drill has bored to a depth of 180 ft. below the 1,000 ft. level, and is now piercing reefy matter, assays of the core of which range from £2 12s. to £8 per ton.

Kathleen Crown.—Cross-cutting is going on to intersect Argall's reef, which shows gold in places in shallow levels, and in the eastern section, where prospecting is being carried out, encouraging indications are met with.

Blagrove's Freehold.—A trial crushing of 4 tons gave 32 oz. of gold. Temporary machinery is being erected, with a view to sinking in order to test the reef and leaders existing in the eastern portion of the property. On the western side the main workings are being vigorously prosecuted.

Welcome Find.—A likely-looking body of stone, believed to be a continuation of the Just-in-Time lode, has been intersected, and the southern lead has been struck in No. 2 level, although at present only 2 in. to 4 in. in thickness, the stone showing colours of gold. When connection is effected with the winze from No. 1 level the development of this block will be undertaken.

Karaka Block.—This is an amalgamation of several holdings—the Poneke Nos. 1, 2, and 3, and the Standard. Eleven men are employed driving on leaders and surface prospecting.

Kuaotunu.

Kapai-Vermont.—Repairs have been effected to the battery, and crushing has been resumed, everything proceeding satisfactorily. A more complete

plant will shortly be erected, and a Krupp mill is to be added.

Cabbage Bay.

A large body of quartz, apparently the outcrop of two reefs running almost parallel, has been discovered in the Jersey ground. Occasional specks of gold were visible, and also in the little quartz seams traversing the country-rock. A drive has been started to cut it at the lower level, when its real value will be more easily ascertained. What is believed to be a continuation of this new find has been got in the Cuvier Light ground, but it is here split into several reefs varying from 1 ft. to 3 ft. in thickness, carrying prospects of gold.

Kennedy Bay.

The Hauraki Associated battery will be completed next month. It is conveniently situated in Kennedy Bay, within easy access of mines on the Tokatea, Waikoromiko, and Kennedy Bay.

Kauri Freehold Gold Estates.

There is considerable activity in the properties owned by the Kauri Freehold Gold Estates, and 140 men are employed in various works at Opitonui. There are several levels working and two shafts are being sunk, on one of which a small pumping and winding plant is erected; this shaft is down 80 ft. The other shaft is being put down by hand-power; it is intended to connect with the Hilda level, which is driven 520 ft., and carries a large body of stone. Several men are out prospecting in different parts of the grounds.

There are twenty-two men working in the Oweria section, driving on the different reefs, and in prospecting works generally. Three of the levels are in 750 ft., 700 ft., and 300 ft. The ventilation is rather defective, but when the levels are connected by winzes, which are being sunk, it will be greatly improved.

Twelve men are engaged at Murphy's Hill driving level and opening up reef.

At Te Rainga, which was worked for a number of years by Lillas and Ryan with very good results, five men are employed building accommodation-houses for the men preparatory to starting work in the mine.

Waikoromiko.

Four-in-Hand.—Five men are driving on line of reef at low level, and are in 240 ft. The reef averages 3 ft. 6 in. in thickness, and makes nice stone, at times showing gold freely. Two men are driving on hanging-wall leader, which is very small at present, but shows gold freely. There is a fair

amount of quartz stacked, which is to be tested as soon as the road to the battery is completed.

Tandem.—Three men are driving on reef and stoping. The level has been driven a distance of 220 ft. The reef averages 2 ft. in thickness, showing a little gold at times.

Cuirassier.—Three men are rising and driving on reef, which averages 15 in., and shows gold occasionally.

GREAT BARRIER DISTRICT.

MR. A. McKAY, F.G.S., Government Geologist, visited the Great Barrier Island in the early part of the year to make an examination of the silver-bearing lodes in the neighbourhood of Blind Bay. He considers that the volcanic rocks of the island are identical with those which on the mainland, within the bounds of the Cape Colville Peninsula, are characteristically developed on Beeson's Island, on both sides of Manaia Harbour, at Cabbage Bay, on the west side of the Peninsula, and on the East Coast, from Port Charles to Mercury Bay. Lodes carrying silver-ores, and in some cases a considerable percentage of gold, occur on both the east and north-west sides of the Te Ahumata Mountain. Silver was first found by Sanderson Brothers in the creek which bears their name, and it was traced along the course of the stream upwards till the Prospectors' or Proprietary lode was found outcropping in the face of a slip. The lode, which strikes east and west, has a high dip to the north, and should therefore extend west across the valley of Sanderson's Creek into the ridge covered with sinter deposits lying between Sanderson's Creek and the upper part of Whangaparapara Harbour; and to the east the lode should run through the Premier Claim. The quartz of the lode in the upper levels, and where richest in silver, was chalcedonic in character, often showing the structure of agate, and extremely complicated in the direction, twisting, and winding of the various laminae of which it was built up, the presence of quartz of this character being considered favourable for the occurrence of ore. In the lower level the quartz is of that peculiar platy character which distinguishes the Try Fluke and Kapai-Vermont lode at Kuaotunu. Although the mine has yielded rich ore, the lode in the lowest level had not been very fully explored when the mine was visited.

The reef in the Proprietary Claim should, in its east extension, pass through the southern part of the Aotea No. 2 Claim, which includes within its area

part of the higher plateau level and southern slope of Te Ahumata.

The Iona Claim occupies the south-eastern and north-eastern higher parts of Te Ahumata, and the middle slopes to some distance below where the andesite rocks appear at the surface. On the north-east side of the mountain a massive reef extends along the base of the sinter cliffs, and of this the hanging-wall is within, and formed of, sinter deposit. At lower levels than 650 ft. it is probable that both walls of the lode are sandstone or decomposed andesite, as the sinter deposits begin at 650 ft. above the sea. The general body of the lode consists of flinty or curly agate-looking quartz, with leads and ribs of granular and crystalline quartz. One sample, analysed in Auckland, yielded gold and silver at the rate of £263 per ton, both metals being about equal in value; but this excessively high return gives no indication of the real value of the lode, as samples taken from the paddock did not go more than 5 oz. to the ton, and showed but a trace of gold. The lode strikes to the north-west, and must eventually pass into the Aotea No. 1 and the Great Barrier Claims, as quartz is found along the course indicated. The direction the Iona lode takes from the foot of the high cliff under the trig. station has yet to be proved, other massive lodes appearing in this part; but, as far as the Iona Claim extends, there can be no doubt as to the identity of the lode stretching along the foot of the sinter cliff.

The Great Barrier Claim is well situated with respect to the probable continuation into its area of the Iona Reef, the presence of which is suspected by the occurrence of huge blocks of quartz along the near and southern boundary of the claim, which betrays the presence of at least one massive lode, as one is seen *in situ* in crossing Ryan's Creek, on the boundary of the Great Barrier and Ryan's Freehold. A small lode to the north-east of the line of the larger reef crossing Ryan's Freehold, which the Great Barrier Company were developing, gave a satisfactory test of £15 to the ton.

The Ryan's Freehold, on its western boundary, is contiguous to the Great Barrier, the reef from which passes into Ryan's at the waterfall, in the bed of the creek. The ore-band varies from 12 in. to 18 in. The ore is richer than in the Great Barrier, and some very fine samples could be easily picked out. A winze was sunk to cut the lode at a further depth of 25 ft. or 30 ft., when it was found to widen out to 2 ft. 6 in., and carrying as rich ore as was found in the upper level. A sample analysed at the Thames School of Mines yielded at the rate of 500 oz. of

silver to the ton, and the general character of the ore was such as to lead to the conclusion that it must be worth, at a moderate estimate, not less than £36 per ton. The country on the foot-wall of the lode within Ryan's Freehold is fairly well decomposed to a kindly-looking sandstone, but this is not likely to continue to any great depth, the foot-wall in the winze being very hard andesite, so that anticipations of soft country along the western part of the lode are rather doubtful. Mr. McKay considers there is ample warrant for the energetic prospecting of this lode in both claims in which it has been traced, as the ore is rich enough to pay for transit to Europe for treatment. Its richness, therefore, to some extent compensates for the smallness of the lode.

Egerton's Claim adjoins the western boundary of Ryan's Freehold, and the rich lode from the latter may pass into it; but as yet only small leaders carrying a little silver have been found, and it seems likely that the southern boundary of the claim may be reached without cutting the rich lode that shows further to the east.

Over the area of the Mount Argentine a great deal of loose quartz, escaping from a very large reef, was scattered on the surface of the ground, but mostly composed of platy quartz, white, hard, and barren-looking.

Of the other claims on the island, the Argyle may be considered as occupying the best position, as it adjoins the Iona on its east side.

THE OLDER AURIFEROUS DRIFTS OF CENTRAL OTAGO.

A SECOND edition of the "Report on the Older Auriferous Drifts of Central Otago," by Mr. Alexander McKay, F.R.G.S., will shortly be ready for publication, in a handy form to correspond with the Geological Reports series. Accompanying the report will be a geological map of the goldfields of Otago, and six sheets of sketch sections, Nos. 1-28. The conclusions arrived at are thus summed up, and should attract the attention of miners, prospectors, and investors:—

A perusal of the foregoing parts of this report will show that, with respect to the older breccia conglomerate beds, these are not confined to the neighbourhood of Gabriel's Gully, Weatherstone's, and Waitahuna,—that they may be looked for, and prove auriferous, along the lower hill-slopes to the south-east, along the borders of the Tokomairiro Plain, and over parts of the Kaitangata Coalfield, where the lower beds of the Cretaceous-tertiary

series are exposed. Also, as has been shown, there is a large development of the same beds in the Horse Range, from the downs on the south-west side of the range to South Peak, north-east of the gorge of Trotter's Creek. The same beds also appear in Mount Vulcan, on the north side of the Shag River at its mouth. At Blue Spur, Weatherstone's, and Waitahuna the beds are known to be auriferous, and also in the Horse Range. They should be prospected wherever prospecting can be carried on at a moderate cost, since it can hardly be that the three localities which have been worked are the only places where these beds are auriferous.

With respect to the older quartz drifts, they have been the great source from which gold was set free to enrich the more modern gravels at a great number of places on the Otago goldfields. An endeavour has been made to make it clear that these beds have not their auriferous parts arranged like leads along an old river-bed, nor in fan-shaped deposits such as might have accumulated at the mouths of rivers or lesser streams falling into a lake. It has been shown that the gold is found in a particular stratum or strata, which, as in the case of the Maerewhenua goldfield, extends over its entire area, or the gold may be more concentrated in particular areas of lesser extent; but still, in every case, it has to be considered that we are dealing with a gold-bearing stratum which has to be prospected after the manner of a coal-seam. Where the beds are tilted so as to stand at considerable or high angles, and are not overlain by younger deposits, they can be easily prospected by trenching along the surface of the ground; and even when the dip is at moderate angles, as in the Maerewhenua goldfield, the outcrop of the auriferous stratum is for the most part easily to be found.

Further prospecting should be carried on in these beds in the hilly country between Pigroot and Hyde, at Hamilton's; under the basaltic sheet and along the line of outcropping drifts to the Sowburn, and along the different lines that appear round the borders of the Maniototo Basin, Ida Burn and Poolburn Valleys, and in the Manuhirikia Valley, and wherever the beds are met with east of the Molyneux River. The newer quartz drifts and breccia conglomerates of Tinker's, Drybread, and some other places along the south-east base of the Dunstan Mountains should be further prospected in the same way.

The great difficulty in the way of the further development of alluvial mining in Otago is the scarcity of water, and the difficulty of bringing an abundant supply on to many places where hydraulic sluicing could be carried on profitably. The measure of the water available is, therefore, that which must determine the rate of progress and increase of this form of gold-mining in the districts examined. At Fullerton's, Hyde, Hamilton's, Black's No. 3, St. Bathans, and several other places very rich driving-ground was met with in the quartz drifts, but it was never, apparently, rightly understood under what conditions the gold stratum had been deposited, and, as a consequence, prospecting by shafts in the deeper ground was usually adopted, when the gold-bearing stratum might have been followed at the surface. It is hoped that this report has thrown some light on the subject, and that future prospecting will be carried on for driving or sluicing ground, not by the costly method of deep-shaft sinking, but by following the outcrop of the auriferous gravels where these have been proved, and by

trenches cut across the belt of drift country where the gold-bearing stratum has not been determined.

Of the newer quartz drifts and breccia conglomerates on Criffel Face, Cardrona Valley, much cannot as yet be said, but it is a field that is very well worth prospecting, since it may prove to be continuously auriferous from opposite the Cardrona Township to the mouth of the valley near Mount Barker. Of the newer Miocene or older Pliocene conglomerates, locally known as "Maori bottom," these may not at many places be rich in gold, but they are at the present time worked at several places—notably at Switzer's—and indicate a source of gold that is practically inexhaustible.

The old high-level lake terraces at the Crown Terrace, Arrowtown, Frenchman's, and Mid Run, in the Upper Clutha Valley, show that at similar levels in other localities like deposits of an auriferous character may be found.

A RETROSPECT OF OHINEMURI GOLDFIELD.

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[By Mr. JOHN MCCOMBIE, Manager of the Woodstock Company's Mine, Karangahake.]

II.

BEFORE leaving Karangahake a few words may not be out of place respecting the scenery, about which, by the way, very little is known, because this subject appears to have been studiously avoided by all visiting newspaper representatives. Close to the township is the confluence of two rivers, named respectively Ohinemuri and Waita-wheta. For many years after the opening of this district for gold-mining the valley of the last-mentioned stream was a *terra incognita*, explored only by the most intrepid gold-hunters—men who risked their lives daily in scrambling about the deep gorges and rocky buttresses that abound in the neighbourhood. Entering the gorge of this river, which has now been made easy of access by the tram-line belonging to the Woodstock and Crown Mines, the foothills have a comparatively gentle slope downwards to the water's edge, and here the visitor may ramble according to the freedom of his own sweet will, ever finding out fresh surprises in the way of picturesque scenery. Passing on through the gorge, which is not more than 100 ft. across at the widest part, the cliffs rise up almost perpendicularly to a height of fully 600 ft. above the level of the river, which at times is simply a raging mountain torrent. During the winter season, when this stream is in flood, the waves seem to be tearing each other to pieces, flinging particles of water high in the air, while the rocks with which the river-bed is strewn break the force of the water and reveal themselves in black patches, relieved with streaming

silvery lines of spray. Looking at the wild tumult of waters hurrying onward to the sea, one begins to experience a feeling of awe at the immense resistless force of this raging element.

Towering above are these wonderful walls, formed possibly by volcanic action ages ago, when the whole country was in a state of eruption, and when there were no human witnesses to record the event. At first they rise straight up and solid; anon breaking into terraces, flying buttresses, and pinnacles, presenting a wild confusion most beautiful to behold. Here the rich foliage of native evergreen trees and shrubs, intermingled with ferns and fronds, scattered over the weather-beaten rocks, combine to form a picture of exquisite loveliness which no admirer of the beautiful in nature can look upon for the first time without expressions of delight.

Leaving behind the most precipitous part of the gorge, the visitor passes a succession of thickly-wooded ravines that slope in graceful curves down to the river-bank, and now every turn in the course of the serpentine stream opens out a prospect that, I venture to say, cannot be surpassed anywhere. About one mile from the starting-point a full view is obtained of the Crown Mines Company's dam, which stretches across the river from bank to bank, backing up the water to a height of several feet above its normal level, and the overflow looks like a mirror of polished glass framed in a setting of nature's own handiwork.

Further afield the valley expands quite suddenly, forming on the proper left-hand bank of the river a plateau of about 100 acres in extent. This produces an immediate change in the scenery, which is now more open and less bold, but withal in many places it forms a most pleasing prospect. Here, it is said, Te Kooti and his band of marauders camped for several months to recruit their energies, while the colonial forces were scouring the country between Waikato, Taupo, and Tauranga endeavouring to locate their whereabouts. To verify this story there are the remains of a large settlement, with traces of extensive cultivations, and all the "coignes of vantage" within easy distance have undoubtedly been made use of for defensive purposes.

The road leading from Karangahake in the direction of Waitekauri and Waihi follows the course of the Ohinemuri River, and passes through the gorge which forms the bed of that stream. For wild, rugged grandeur it would be hard to eclipse the general surroundings visible from this line of traffic. When about half-way through the gorge the narrow road, precipitous cliffs, and turbulent mountain tor-

rent combine to make up a picture which reminds one of the old-time highly sensational stories about the early days of California, before the age of stage-coach roads, and when little or nothing was known about the "iron horse." Then it was only men of the most adventurous turn of mind who would face the perils to life and limb attendant upon a trip across the "Rockies." Whenever two horsemen coming from opposite points met on a bridle-track, scarped out of the rock, in one of the many cañons that abound in that mountainous region, they used to toss up a coin in order to determine which of the animals should be shoved over the cliff so that the remaining one could continue its journey. Although it is scarcely so bad as that in the Ohinemuri Gorge, there are places where the road is so very narrow as to afford space for one vehicle at a time only, and when two meet at one of these places then the trouble begins. It is highly amusing to watch the tactics of the respective "Jehus," each one wondering whether the other will take the initiative and clear out of the way. Usually, after a little argument, it is finally decided that the one having the lightest load shall unyoke his team, hitch them on to the rear part of his vehicle, and thus beat a retreat to a wider part of the line. Then the gorge re-echoes with language more forcible than elegant, and the local as well as the general governing bodies come in for a large share of villanous abuse. This, however, is a *contre-temps* which does not happen very often, and as time goes on the narrowest part of the road will have to be widened to meet the growing requirements of the wheeled traffic upon it.

Waitekauri.

Whilst the pegging mania was raging at Karangahake a small party of men, led by a prospector named Leahy, might have been seen wending their way in the direction of Waitekauri, where they marked off several claims, which were subsequently amalgamated, and formed what was known as the old Waitekauri Company's Mine. At the time of which I write Waitekauri was so completely surrounded by an almost impenetrable forest that but few men cared to encounter the hardships which attended a visit of inspection or a prospecting tour to the district. Shortly after Leahy and party started operations a bridle-track was cut by Government from Paeroa to the mines, which attracted a good deal of public attention when it became known that Leahy's reef, as it was then called, contained gold in payable quantities. This reef ranged from 5 ft. to 25 ft. in thickness, and the prospectors very soon demonstrated its value by

intersecting it at different points with cross-cuts put in at depths ranging from 25 ft. to 200 ft. beneath the surface. This as a preliminary work was all very well in its way, but the "sinews of war" were required to erect machinery, and eventually arrangements were made with Messrs. Brown and Bleazard for the erection of a forty-stamper battery. This work was placed in the hands of Mr. E. M. Corbett, who, notwithstanding the many difficulties with which he had to contend, turned out a plant which for general efficiency was one of the best in the colony. For some time after the start of the new mill the average yield was a good one, but the returns gradually fell off until it was deemed advisable to suspend operations altogether, and the mine was then cut up into blocks, and these blocks were readily taken up and worked on the tribute system. From the very outset several parties of tributers did remarkably well—notably Butler and party and Hollis and party, who took bullion to the value of £20,000 out of their respective tribute sections within a period of eighteen months. The lode from which this rich result was obtained measured about 4 ft. in thickness. It was running almost parallel with and west of the main lode, and in some places the ore was fairly peppered with the precious metals. One parcel of several hundred tons yielded bullion to the value of about £30 per ton, and then the percentage of extraction by the old system of wet-crushing and amalgamation was a comparatively low one. Eventually the blocks of ore opened up above the old levels were worked out, and for some unexplained reason success did not attend the efforts made to open up new blocks by means of lower levels. At present the original holdings are now held partly by the Waitekauri Gold-mining Company and partly by the Jubilee Gold-mining Company, and the head-quarters of both concerns are located in London.

The Welcome and Young New Zealand Claims ranked next in importance to the Waitekauri Claim, and at an early stage in their history the "show" was so good that Mr. H. C. Wick built a ten-stamper battery on the Mangakara Creek, about two miles distant from the mines. Both claims furnished the battery with sundry parcels of ore, and one crushing from the Young New Zealand yielded as high as 20 oz. of bullion per ton. The Welcome passed a large tonnage of ore through Wick's battery, and the returns ranged from 1 oz. to 6 oz. per ton. Although the lodes in these two mines were very rich they were patchy, and after many ups and downs both properties were relegated to tributers, who made fair wages out of their ventures for several years.

IS CYANOGEN CAPABLE OF DISSOLVING GOLD?

THIS was a question publicly raised about a year ago by the Government Analyst, and now answered in two papers read before the Wellington Philosophical Society.* Mr. Skey, the Government Analyst, in effect, states prior to that time no chemist, to his knowledge, had publicly given any opinion on the matter; still the chemical world had, by a sort of tacit consent—a silent acquiescence—allowed the implication contained in the now famous cyanide patent (that cyanogen does dissolve this metal) to be correct. As far back as 1874 he had stated his opinion in a paper—an opinion backed by a good deal of argument—that this gas, cyanogen, was not classed correctly as with the haloids—chlorine, bromine, &c.; that it should rather be classed with oxygen. With the cyanide process lately so much before him, he looked up that paper, and so was led to doubt the capability of the gas in question to dissolve gold, and was thus induced to investigate the matter, when he soon got results of a very pronounced character, which are stated here as concisely as possible: Gold-leaf ($\frac{1}{270000}$, say, of an inch in thickness), after contact with cyanogen in the gaseous form or dissolved in water acidulated by hydrochloric acid, does not show any signs of erosion, even after the lapse of five days.

In another and a still more rigorous test a mere trace—the faintest flush of gold—was presented on paper to a saturated aqueous solution of the gas, feebly acidulated as before, when it was found that even after seven days† had elapsed no difference of the gold tint on the paper was shown. Had the gold taken that time to dissolve, a strip of ordinary gold-leaf would require about five years for the same purpose.

In this connection Mr. Skey states that cyanogen as used in cyaniding would have but very little tendency to form, by its decomposition, products that are solvents of gold, as both air and water, also quartz reefs, have generally an acidic reaction, thus having a *conserving* effect on cyanogen in the place of a *decomposing* effect, as all alkaline substances have.

From these facts it is certain that cyanogen can never be profitably used for the alternative to an alkaline cyanide as proposed or patented by the patentees of the cyanide process; it is also as plainly shown that cyanogen is not the solvent in this process,

* Trans. N.Z. Institute, Vol. vii., page 379.

† Two months after this no change in the tint of the gold-paper could be observed.

as some would have it, but that an alkali is just as necessary for it as the gas. Indeed, whether the gold is first oxidized or cyanodized, an alkali is necessary for the process. If first cyanodized, as no doubt much of it is,* a partial decomposition of the cyanide used takes place, but this cyanide or oxide of gold thus formed, being insoluble in water, requires an alkaline cyanide (say, potassic-cyanide) to bring it into solution for its subsequent extraction, which it does by forming the comparatively stable and well-known salt, auro-cyanide of potassium. Thus it is that the potassic-cyanide is the real, the only solvent of the gold won by the cyanide process.

Such, then, appears to be the true state of the case in regard to the chemistry of this process, now that it is shown that free cyanogen is practically unable to bring gold into solution.

PUBLICATIONS RECEIVED.

- "Report from the Select Committee on Petroleum," and Minutes of Evidence. Ordered to be printed by the House of Commons. From the Agent-General.
- "Reports of the State Mineralogist," California, for 1889, 1892, 1894, and 1896. From J. J. Crawford, Esq., State Mineralogist.
- "Mine Drainage and Pumps." By Hans C. Behr, Mechanical Engineer.
- "Oil- and Gas-yielding Formations of Los Angeles, Ventura, and Santa Barbara Counties." By W. L. Watts, M.E., Field Assistant.
- "The Gas- and Petroleum-yielding Formations of the Central Valley of California." By W. L. Watts, M.E.
- "The Cyanide Process: its Practical Application and Economical Results." By Dr. A. Scheidel, E.M.
- "Californian Gold-mill Practices." By Ed. B. Preston, M.E., Field Assistant.
- "Methods of Mine-timbering." By W. H. Storms, M.E., Field Assistant.
- "Act establishing a Uniform System of Mine Bell-signals."
- "The Caminetti Law, and Act defining Hydraulic Mining."
- "State Mining Law," and "State Mining Bureau Act."
- "The Mineral Productions of California for the Year 1896." By Chas. G. Yale, Statistician. From J. J. Crawford, Esq.
- "Annual Reports" for 1896 of the Mines Departments, Queensland and New South Wales. From the Under-Secretaries.
- "Gold-mining Statistics for the Year 1896." Issued by the Department of Mines, Western Australia.
- "Kalgoorlie Output of Gold, and other Interesting Information issued under the Authority of the Kalgoorlie Chamber of Mines."

"Monthly Analysis of Gold Production in the Witwatersrand District, South Africa." From the Chamber of Mines, Johannesburg.

"List of Companies registered with the Auckland Chamber of Mines." Issued August, 1896. Price, 6d.

"Annual Report for Year 1896 of Zeehan School of Mines and Metallurgy."

"Forty-eighth Half-yearly Report of the Mount Bischoff Tin-mining Company," Tasmania.

"Report on the Results of a Census of the Colony of New Zealand." By E. J. von Dadelszen, Registrar-General.

CORRESPONDENCE.

WET VERSUS DRY CRUSHING.

TO THE EDITOR.

SIR,—In your first number I am credited with the statement that I did not consider wet-crushing, with a dilute solution of cyanide in the mortar-boxes, would be at all suitable for the treatment of ore now being dealt with in the Woodstock battery. This is not correct. What I did say was that, although the wet process might prove suitable in the case of the Crown ore, it did not by any means follow that it would be equally successful in the treatment of ore from the Woodstock or any other mine. Nothing short of a practical test will determine this point, and the Woodstock ore will be subjected to this test very shortly.—I am, &c.,

JOHN MCCOMBIE.

Karangahake, 16th August.

JADE is found in the Bhamo, Chindwin, and Katha districts, in Upper Burma. The workings are chiefly in the Bhamo district, from which 254,000 lb. were obtained in 1895. Nearly all of this goes to China, where jade-stone is highly valued.

THE mica industry is confined to the Hazaribagh district, and is gradually gaining in importance, according to *Indian Engineering*. Most of these mines are situated in the Koderma Government reserved forests, and the rest are scattered over portions of Gadis-Gawan, Domchanch, Khesmi, Mushnudih-Byria, Dorunda, and Satgawan. The mica-mines in the Government estates and in the Dorunda and Satgawan Estates, which are under Government management, have been let out in accordance with the rules framed by the Government. The greater number of the mines situated in the private estates are worked by Messrs. Christien and Company. The total output of all mica-mines worked in the district in 1895 is reported to be 8,019 maunds, against 4,849 maunds in the previous year, and the total number of workmen employed in the mines 5,409, against 3,718 in 1894.

* Trans. N.Z. Institute, Vol. xxix, page 580.

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THE

New Zealand Mines Record.

VOL. I. SEPTEMBER 16, 1897. No. 2.

[Issued by the Mining Bureau of the Mines Department, New Zealand, under the authority of the Hon. A. J. CADMAN, Minister of Mines.]

NOTES AND COMMENTS.

THE quantity of gold exported from New Zealand for the month of July was 29,586 oz., valued at £115,443, and for August 16,355 oz., valued at £61,194, or a total for the two months of 45,941 oz., valued at £176,637. For the quarter ended the 31st March the export was 69,621 oz., valued at £275,816; for the quarter ended the 30th June, 60,046 oz., valued at £233,928; so that the average is more than sustained. The export of gold for the first three quarters of 1896 was 196,689 oz., the average per month being 21,854½ oz., while the average for July and August, 1897, was 22,970½ oz. The quantity exported from the various districts for July and August is as follows:—

July.			August.		
District.	Quantity.	Value.	District.	Quantity.	Value.
	Oz.	£		Oz.	£
Auckland ..	6,847	23,983	Auckland ..	8,062	28,216
Westport ..	1,232	4,931	Nelson ..	652	2,414
Greymouth ..	5,798	23,195	Greymouth ..	3,272	13,091
Hokitika ..	2,749	10,896	Hokitika ..	2,158	8,628
Dunedin ..	11,664	47,254	Dunedin ..	629	2,517
Invercargill ..	1,296	5,184	Invercargill ..	1,582	6,328
Total ..	29,586	115,443	Total ..	16,355	61,194

In addition, Auckland exported 18,684 oz. of silver, valued at £2,177, and 19,149 oz., valued at £2,182, for the months of July and August.

THE gold-mining industry shows a steady improvement throughout the colony. In the *Hauraki Goldfields* the Ohinemuri yields are well sustained, and the New Zealand Talisman has added a respectable quota to the gold product of that important district, the returns from which show a substantial improvement. At Coromandel a much more hopeful tone prevails, some rich finds having been recently reported. The returns from the Thames for the month of August are smaller than usual, on account of the

county water-race having broken down, but the necessary repairs have been completed, enabling the batteries to resume crushing. In *Marlborough* the Gorge Company and the Wakamarina Dredging Company have met with a fair amount of success, with the result that the whole of the Wakamarina, from its junction with the Pelorus up to and above the Gorge, has been pegged off, though very little else than pegging has so far been done. In *Nelson* there is a good deal of activity in the Collingwood district, and large numbers of men are employed by the Taitapu Gold Estates and Collingwood Goldfields Companies. There are strong signs of revival in the *West Coast Goldfields*. In the Westport district the General Exploration Company have mapped out very extensive works. At Lyell the amalgamation of the two leading quartz-mines should lead to a better and more economical system of working. At Reefton the Consolidated Goldfields and the Progress Mines of New Zealand are carrying out important development works on a large scale, while the Keep-it-Dark, Big River, and other companies are steadily at work. At Kumara an important discovery has been made near Dillman's, where gold has been found at a considerable depth below the "false bottom" previously worked, and eight or nine claims are on gold. In the Grey Valley the Barrytown Flat Company are engaged in the erection of extensive machinery for sluicing. The capital of the Roaring Meg Sluicing Company has been subscribed in Wellington; and it is in contemplation to place a dredge on the Grey River. In Hokitika some rich finds are reported, and news has been received of the formation of a company in London to work the Waiho Sluicing Company's ground. In *Otago* the success of dredging operations on the Molyneux and Kawarau has led to the formation of a number of companies, and all the foundries are kept busily at work building new dredges. Dredging has been commenced on the Waikaka Stream, and a new dredge will shortly be completed on the Waikaia River, about three miles below the township, and another is contemplated on the Argyle Stream, about a mile above the township. In the Wakatipu district the three principal quartz-mining companies—the Achilles Goldfields, Glenrock Consolidated, and Westralia and New Zealand Gold Explorers—keep up a fair average yield of gold in proportion to the quantity of stone crushed. At Preservation Inlet increased yields are reported from the Morning Star, the last few crushings approaching to nearly 2 oz. per ton, with a value of not less than £4 per ounce. The Golden Site Company are now sinking a good shaft in the same locality, a third

company is in course of formation to test the reefs, and increased attention is being directed generally to the Preservation Inlet district. Prospecting operations are in progress in several parts of Otago, and it appears in every way likely that more attention will be paid to quartz-reefing in that part of the colony than has been hitherto the case.

THE "Notes from the Mines," which are to some extent a continuation of those published in the first issue, will tend to give an idea of the importance of the industry on which Mr. Gordon stated, in his inaugural address to the New Zealand Institute of Mining Engineers, about one-ninth of the total population of the colony are directly or indirectly dependent. Fresh "Notes" are added from many places, and the officers of the department scattered throughout the colony will continue to supplement these from time to time.

THE Hon. the Minister of Mines convened a conference of Goldfields Wardens, past and present, on the 4th August, to discuss the provisions of a consolidating and amending Mining Bill which it is proposed to introduce next session. The following gentlemen were present: Messrs. McCarthy, Bush, Poynton, Macfarlane, Hawkins (Wardens), and Messrs. Eyre-Kenny and Greenfield (ex-Wardens). Mr. Greenfield was elected chairman. The Hon. Mr. Cadman attended whenever business permitted, and Dr. Fitchett, Law Draughtsman, was present throughout. Suggestions from all parts of the colony were received and carefully discussed. The sittings lasted for ten days, and at the conclusion the Minister complimented the members of the conference on the careful attention given to the Bill. In return, the members thanked the Minister for having given them the opportunity of discussing the measure which it will be their duty to administer. They also paid a high compliment to Dr. Fitchett for the excellent shape in which the Bill was brought before the conference. The Bill will be widely distributed.

THE Government are about to issue the required ninety days' notice of intention to proclaim the following rivers and creeks on the west coast of the Middle Island, together with all their tributaries, in accordance with section 152 of "The Mining Act, 1891," watercourses for the deposit of tailings, &c.: Maruia River, Wharariki River, Mangamangarakau River, Te Hapu Creek, Waitaki Creek, Ngutuihi Creek, Paturau River, Blowhole Creek, Punipawa Creek, Sandhills Creek, Slaty Creek,

Malone's Creek, Anatori River, Turinawivi River, Anaweka River, Raukawa River, Big River, Kahurangi River, Seal Creek, Waimori River, Waterfall Creek, Heaphy River, Kararoa River, Wekakura River, Kohaihai River, Blackwater Creek, Mokihinui River, Ngakawhau River, Dee Creek, Rough Creek, Coal Creek, Leading Creek, Walker's Creek, Black-sand Creek, Wareatea River, Deadman's Creek, Waimea Creek, Orowaiti River, Soldier's Creek, Grey River; and the Wakamarina and Pelorus Rivers, in the District of Marlborough.

AN export trade in sulphur and pumice has sprung up in Auckland. From the 1st January to the 31st August, 1897, the following quantities were exported:—

		SULPHUR.		Tons.	Value.
					£
New South Wales	..	..	1,088		2,472
Queensland	..	..	350		1,300
Totals	..	..	1,438		£3,772
		PUMICE.			
United Kingdom	..	..	30		90
Victoria	..	..	5		23
New South Wales	..	..	559		1,631
Totals	..	..	594		£1,744

All the sulphur was mined at Tikitere, near Rotorua, and the pumice at Rangiriri, Waikato.

A REPORT has been received from Captain Hodge in reference to the working of the Schram hand-power diamond prospecting drill. Where worked in the New Hauraki Gold Properties (Limited), Coromandel, they were exceedingly well pleased with it. In the ordinary decomposed andesite they bored 20 ft. per day for several days, but in the class rock (a core of which was sent to Mr. McKay, Government Geologist) they could only bore 6 ft. per day. Since then two additional bores have been put down, which proved the dark slates to exist very high up in the New Hauraki, and developments in prospecting levels are now going on above these slates in the andesite rock. Great care must be exercised in raising and lowering the crown to preserve the diamonds, and a small stream of water is necessary in the bore while operating; consequently, it is essential to locate the bore where water can be easily procured. There are many places where the nature of the country will not permit of testing the ground to a depth of 190 ft. to prove the rock without sinking prospecting shafts, and where, if the character of the rock were known, it would be of importance to the development, but with this little machine it could be solved at a cheap

rate. Captain Hodge thinks that if a few of these drills were distributed around the various goldfields they would undoubtedly lead to valuable discoveries. They are easily transported and erected. The machine, which is worked by direct motion employing three men, produces a core about $\frac{7}{8}$ in. in diameter. The actual cost in London, irrespective of packing, is £175, or, with extra crowns set in the diamonds, £200. Captain Hodge thinks the cheapness of the machine, considering the work it accomplishes, is marvellous.

THE Kuaotunu Prospecting Association have forwarded an application for assistance towards prospecting the Waitaia Range, in which they state they have lately started prospecting operations and obtained fair prospects of gold. As there is a balance of £22 4s. for prospecting the Opito district, a transfer of the unexpended amount has been sanctioned, on condition that the money is expended in accordance with the regulations.

THE Kumara Prospecting Association have applied for a subsidy for Black and party, who are prospecting near the Christchurch Road, and, as the ground now being tunnelled is wet, they ask that an additional grant of 9d. per foot be made. The association have been requested to furnish a statement of the nature, extent, and estimated cost of the work, and informed that, in the event of a subsidy being granted, the rates prescribed by the amended regulations must be adhered to.

THE Hokitika Harbour Board have applied for permission, under section 204 of "The Mining Act, 1891," to lease for a further term of fourteen years, for pastoral purposes, Harbour Board Endowment Reserve No. 145, Arahura District, containing 14,150 acres. The reserve, which had been let in one block for the past seven years, has been subdivided into five blocks, and alternate tenders invited for leasing in separate blocks or as a whole. A report having been received to the effect that all mining rights and privileges had been fully protected in the conditions of lease, it has been decided to recommend that the necessary permission be granted.

THE Auckland Chamber of Mines have made a number of recommendations for alterations in the Mining Act and regulations, some of which will be provided for in the Bill for consolidating the various Mining Acts to be submitted in the ensuing session.

Mr. F. J. KING, of East Oxford, has applied for a prospecting license over Crown lands in the Oxford Survey District, Canterbury, and his application has been granted.

DURING the hearing of an application at the Thames Warden's Court on the 24th August for permission to work a special claim, on which the rent had just become due, with a less number of men, the Warden intimated that in future, when any application for permission to work with less men or for protection was made, the application would not be entertained if the rent was within a few days of being due. He considered if people having interests in mines desired to obtain any privilege from the Court the least they could do was to see that the rent was provided for if about to become due shortly. In future all applications, the rent on which would become due within one month, would be adjourned until that time had elapsed and the rent was paid. One of the chief reasons for the rule was the protection of licensees, some of whom, though owning little or no interest in the holdings, were made liable for the rent because the other, the actual owner, would not pay. He therefore was forced to pay as the licensee, being the only person on the register. This state of affairs was frequently brought about quite against the wishes of the licensee, because the owners had failed to register the transfer. This class of persons required protection, and the Warden considered the proposed rule would to some extent protect them.

COMMENTING ON Mr. L. D. Nathan's statement in Auckland that £2,000,000 had been diverted from New Zealand owing to the legislation passed in recent years by this colony, the *British Australasian* of the 22nd July says: "This may be so, but the dimensions of the list of the London-owned New Zealand mining properties periodically printed in the *British Australasian* indicate that capitalists have plenty of confidence both in the New Zealand gold reefs and the good faith of the New Zealand Government."

"It was only the other day I had a conversation with one of our pioneer miners, who was working ground near Cromwell in '62," writes the *Wakatipu* correspondent of the *Otago Witness*, "and he described how, after obtaining gold by the pound weight with the cradle, the tailings discharged from it were covered with gold, and upon passing the tailings through the cradle again, and saving a goodly number of ounces, the gold in the rewashed tailings appeared

as plentiful as ever; and it may well be said that if gold was obtained by the pound weight it was also lost by the pound weight, and is still waiting to be raised and saved by up-to-date appliances."

At the annual meeting of the Blue Spur and Gabriel's Gully Consolidated (Limited), held in London on the 28th June, the chairman (Sir John Stokes) stated that the directors had discontinued the practice of having the gold forwarded to London, where it brought £3 18s. 6d. per ounce, as Mr. Howard Jackson, the company's manager in New Zealand, had obtained £3 19s. for it in the colony.

OPALS of high quality, and apparently in commercial quantity and size, have been found at the Tairua Valley, in the Cape Colville Peninsula. They also occur in the Ohinemuri Valley, and there is promise of an important industry developing in this connection, a strong company having been formed in Auckland for the purpose of discovering the gems. A discovery of opals in the mountain country beyond Mount Somers, in Canterbury, was reported a few months ago, but, owing to the snow, nothing is being done at present in that locality.

EXPERIENCED mining men are of opinion that a large area of ground held by the Kauri Timber Company between the Kauaeranga River and Tairua is well worth prospecting, as gold has been found from time to time in that locality.

THREE Mining Exhibitions are talked of, and likely to be held—one in London, another in Coolgardie, and a third in Auckland. Mr. W. R. Holmes, the Secretary of the Auckland Industrial and Mining Exhibition, states that "the public are taking the matter in hand with great spirit, and there is not the slightest doubt that the Exhibition will be an unqualified success. The amount guaranteed is over £3,000, and we anticipate reaching £3,500 without any difficulty. It is not proposed to open until towards the end of next year—probably November, 1898."

A ton of ore from the Hihi Special Claim, where a fresh discovery of gold was recently reported, has been crushed at the May Queen Company's battery, Thames, and gave a return of 12 oz. 4 dwt. of melted gold. Where the stuff was taken from was not a well-defined lode: it was more in the form of a cement or conglomerate formation, but the results are very

encouraging, and further prospecting may lead on to something of importance. The Hihi Creek, which forms one of the branches of the Kauaeranga River, is about fourteen miles south-east of the Thames Township.

A CINNABAR lode has been discovered by Mr. Robert Lowrie in the Mangakirikiri Creek, a branch of the Kauaeranga River, about eight miles from the Thames. The prospectors (Messrs. Lowrie Brothers and Robert Stevenson) have applied for a prospecting license of 400 acres, which has been granted. They are confident that they have discovered the lode, and have traced it on the surface through 100 acres. One test has been already made, and a larger parcel will be shortly tested.

REPORTS on water-conservation in Central Otago have been forwarded to the Hon. the Minister of Mines by Mr. T. Perham, C.E., of the Public Works Department, and will be laid on the table of the House when Parliament meets. Mr. Perham travelled over 800 miles by coach, buggy, and horse during his explorations of the country, and, in addition, did a good deal of travelling on foot. Starting at Naseby, the country was examined in connection with the Eweburn Dam to supply the gold-workings in and around Naseby. Then followed an examination of the Wedderburn, where it has been proposed to construct a large reservoir for irrigating the whole of the Maniototo Plains. St. Bathans, as well as the surrounding country, was visited in connection with the sludge-channels; and Matakanaui and Tinker's in connection with a large dam for supplying water for sluicing-claims at Vinegar Hill and adjacent districts. Ida Valley was examined as to the feasibility of obtaining water for irrigation purposes; and Poolburn Gorge in connection with a large dam for gold-workings at German Hill and other places. At Ophir (or Black's) Mr. Perham was interviewed by several deputations, who explained to him various suggestions made as to proposed works. From Ophir he went to Alexandra and Clyde, where the country was examined in regard to the proposals for supplying water to irrigate the Government Experimental Fruit Farm and other fruit farms in the neighbourhood, and also with regard to a supply of water for the mining-claims in these localities. Mr. Perham proceeded up the Fraser River, and examined Shepherd's Flat and various other places in connection with a proposal to supply water to the Dunstan Flat. An examination was made in

the neighbourhood of Earnsclough, where half a dozen fruit farms are privately supplied with water for irrigation: each of these farms sends annually to Dunedin between 20 and 30 tons of stone fruit. Miller's Flat was visited in connection with the proposal to supply all the mines in that neighbourhood with water from Lake Onslow (or Dismal Swamp); and Lawrence in connection with the water-conservation scheme at Upper Waipori. Mr. Perham left Central Otago for Westland to report on the proposal for augmenting the water-supply at Kumara, and also in connection with the Kanieri Lake, Rimu, and Back Creek Water-race for supplying water for sluicing at Seddon's Terrace. Mr. Perham spent a little over two months in his examination of Central Otago and Westland, and did a considerable amount of preliminary work during that time, the results of which are fully explained in his reports.

DURING his recent visit to the West Coast the Hon. Mr. Cadman, starting from Nelson, visited all places of interest as far south as Ross, including Westport, Addison's, Mokihinui, Lyell, Reefton, Boatman's, Totara Flat, Greymouth, Kumara, Hokitika, Rimu, Ross, &c. Mr. Cadman's principal object in visiting the Coast was to confer with the local bodies in reference to the most necessary works on roads and bridges, &c.; and he went exhaustively into the subject with each of the Councils, besides receiving numerous deputations in each centre visited. Probably the most important matter brought before him was the bringing-in of water to the Rimu and Kumara fields. The people of Hokitika and surrounding districts were very anxious that the Government should bring in the water from the Kanieri Lake to Rimu, or assist private parties who might be prepared to undertake such work, estimated to cost £50,000. While admitting the necessity for a further water-supply, the Hon. the Minister of Mines said he could not see his way to commit the colony to such an expenditure. At Kumara the necessity of bringing in the Wainihinihi Stream and purchasing certain rights claimed by Mr. Wylde, the discoverer of the water-supply, was urged on the Minister, who would not admit that Mr. Wylde was entitled to anything beyond, perhaps, a reward for his discovery, and it was finally decided that Mr. Wylde should make a formal offer to the Government stating what he was prepared to accept for any rights that he might possess. Another important item brought before the Minister was the proclamation of the Grey River, and Mr. Cadman promised to give notice of the intention to proclaim the Grey and its tributaries,

in order to ascertain what sum the claims for compensation would amount to. While at Reefton the Minister took the opportunity of inspecting the quartz-mines which are being worked there on an extensive scale by the Consolidated Goldfields of New Zealand (Limited). During the whole of the tour Mr. Cadman was favoured by fine weather, and was accompanied by Mr. A. H. Richards, the Assistant Inspector of Mines for the Nelson and Westland Goldfields. It is almost needless to add that the honourable gentleman was treated with the kindness and hospitality for which the West Coast is so noted.

THE Maerewhenua district was lately visited by an officer of the Mines Department, who was informed by the miners that, with the exception of an occasional shower or two, there has been no rainfall in that part of Otago during the past nine months. In consequence, the sluicing-claims are for the most part idle, and those who own water-races find their supply greatly reduced on account of the drought. The miners generally agreed that with a water-supply sufficient to enable them to work half-time they could earn good wages. One party is still engaged in bringing in the water-race known as the "Mountain Hut Race." This work has been in hand for several years past, and carried on under great difficulties, many parts of the cuttings having been made in hard rock, and the whole along steep sidelings. Frequent delays have occurred in the construction of this work, sometimes through inclement weather and winter frosts, and at other times owing to lack of funds; but with indomitable perseverance the greater number of the party have returned to the work, and the race is now completed a distance of seven miles from the head, furnishing an illustration of what may be accomplished by energy, pluck, and perseverance. The ten men who have done the work so far are examples of the zeal and untiring energy shown by those who have exploited the goldfields of Otago and overcome many and serious difficulties.

THE whole of the machinery for the branch of the Royal Mint at Perth, Western Australia, has been shipped for that colony.

THE British Columbia *Mining Record* is full of warnings to investors in that colony, and thinks if more money were spent in developing the mines, and less in company promoting, it would be better for both investors and the colony.

THE portraits of Ministers of Mines (from photographs by Messrs. Wrigglesworth and Binns, Wellington), as well as other illustrations in the present and previous issue of the *New Zealand Mines Record*, have been executed by the staff under the charge of Mr. F. W. Flanagan, chief draughtsman of the Lands and Survey Department. Surprise was expressed in many parts of the colony at the excellence of the illustrations in the first number, and to Mr. Flanagan and his staff the credit must be awarded for the artistic manner in which the illustrations were reproduced. The unique and original design on the front cover, which has attracted a good deal of favourable notice, is by Mr. C. H. Pierard, draughtsman, Mines Department.

DREDGING is becoming a very important factor in the product of gold from this colony, and in Otago especially it has lately attracted a great deal of attention, and led to the pegging-out of a large number of claims in the vicinity of the Clutha, Kawarau, and other rivers. The Roxburgh correspondent of the *Otago Witness* published a series of interesting articles, extending over a period of nearly three months, on "The Rise and Development of Dredging in Otago." In concluding (on 19th August) the writer stated that there are fifty-seven dredges working in Otago, thirteen dredges building, and seventy-five dredging claims taken up with the view of placing dredges upon them. He tabulated them as follows:—

<i>Teviot and Miller's Flat.</i>				
Working	..	..	..	13
In various stages (from pegging out to formation)	..	..	..	5
Total	..	..	..	18
<i>Dunstan District.</i>				
Working	..	..	..	15
Building	..	..	..	3
In other stages	..	..	..	27
Total	..	..	..	45
<i>Cromwell District.</i>				
Working	..	..	..	8
Building	..	..	..	5
In other stages	..	..	..	14
Total	..	..	..	27
<i>Teapeka and Neighbouring Districts.</i>				
Working	..	..	..	10
Building	..	..	..	5
In other stages	..	..	..	12
Total	..	..	..	27
<i>Other Places.</i>				
Working	..	..	..	11
In other stages	..	..	..	17
Total	..	..	..	28
Grand total	..	..	..	145

ONE London financier, who was deeply interested in the much-talked-of atomic process for the reduction of ore and extraction of gold, about which a good deal was heard some months ago, has had to seek the protection of the Bankruptcy Court. He stated that he had been compelled to "support the market" by purchasing the shares, and the transactions had resulted in a loss of £80,000.

"THE rich discoveries now being made in the bed of the Kawarau within a stone's throw of Cromwell are certain to redouble the ardour with which the precious metal is sought in the New Zealand Pactolus," remarks the *Otago Witness*. "Perhaps the very ground in which such rich gold is now being found has been gone over repeatedly by the primitive dredges in use at the time of the first Dunstan discoveries, described many times since, and most recently by our Roxburgh correspondent in the series of articles on dredging. The spoon dredge, with its bag of hide, has now given way to the powerful ladder dredge, fitted with titanic machinery constructed to penetrate to hitherto unattainable depths. Finds like those reported recall the early days, and give point to the climax in Sir Julius Vogel's novel 'A.D. 1900,' where, the current having been diverted, the bed was seen to be like a floor of beaten gold. It is probable that the auriferous resources of the river are practically inexhaustible. Nature is still at work. The operations that deposited the gold are still incessantly going on. The Molyneux is a mighty tail-race, knowing no pause and recognising no intermission. There is a great future before dredging in Otago. It will find its ultimate destiny in exploiting the auriferous flats adjacent to the rivers, where working by any other method is impossible. Meantime the river gives up its spoil, and daily affords new proof that no difficulties can withstand the search for wealth."

WHAT has to be guarded against is the flotation of worthless properties and over-capitalisation — two factors which tend to retard the genuine development of our goldfields. Timely notes of warning have already been sounded by the *Otago Daily Times*, *Alexandra Standard*, and other goldfields journals in Otago, and it is to be hoped they will be the means of preventing undue excitement and flotation of worthless properties. Some of the dredges have given results which amply justify the importance attached to this branch of mining, but caution is necessary to prevent undue inflation and the reaction which is a necessary

concomitant of feverish excitement. The *Alexandra Standard* states that fourteen companies were placed in the market in one week, "many of them being of doubtful quantity or problematical with regard to dividend production."

THE following regulations for granting special dredging claims on the sea-beach below low-water mark were gazetted on the 29th November, 1894: 1. All special dredging claims below low-water mark shall be subject to the regulations for special claims and licensed holdings, unless otherwise hereinafter specially provided, in addition to such terms and conditions as may be prescribed by the Warden: Provided that, if at any time, in the opinion of the Warden, navigation is likely to be injuriously affected, he may impose such additional conditions as he may deem advisable, and, subject to the approval of the Minister, may cause mining operations on any special dredging claim to be suspended; but no claim to or right of compensation shall accrue to any person in respect of any such suspension. 2. The extent of any such special dredging claim shall not exceed one mile of frontage on the foreshore, but there shall be no limit to the extent seawards at right-angles to the line of pegs on the foreshore. 3. The claim shall be marked by two pegs, one at each end of the foreshore, above high-water mark, such pegs to be not less than 4 in. square, and to stand at least 2 ft. above the surface of the ground. 4. There shall at all times be at least ten men employed on every such special dredging claim, and failure to comply with this provision shall render the claim liable to forfeiture.

A REPORT has been received in reference to applications made on several occasions for aid towards sinking a shaft to bottom the deep alluvial leads at Matakānui, in the St. Bathans district, Otago. The ground which the Matakānui Prospecting Association want to prospect to a deep level occurs at the base of the Dunstan Gorge, and is said to run from Clyde to St. Bathans, a distance of fully thirty-five miles, Matakānui being nearly midway between those towns. At Matakānui the lead has been exposed and worked by hydraulic sluicing for about a mile practically without a break, but showing a variable width of from one to three chains at the surface; while at Drybread, some three miles north, it is also exposed by sluicing operations. Sluicing in this ground is only available to the same level as the bottom of the adjoining alluvial wash, and, although it is possible to work out an additional 60 ft. by hydraulic sluicing, the deep

part of the lead, if payable, must be worked from shafts. It was to ascertain whether gold in payable quantities could be found at the bottom of this lead that Fogarty and party commenced a trial shaft, about eight years ago, on the Sugar-pot Claim. After sinking 240 ft. below the sluiced level cross-drives were put in, proving the lead at that depth to be 66 ft. wide from wall to wall. The work was then abandoned, after £720 had been expended, and the shaft is now filled up. Various statements are made as to the gold obtained at this level. Mr. Fogarty claims that $2\frac{1}{2}$ oz. per ton were obtained in a narrow band of wash; but other men who were working in the shaft with him assert that it was no richer at 240 ft. than at ordinary sluicing level. At the Sugar-pot Claim the alternate layers of wash and clay dip eastward; about half a mile further south the layers dip to the west. The Matakānui Prospecting Association, composed of a number of local miners and a few business people in Dunedin, are now sinking a new shaft, 6 ft. 8 in. by 3 ft. in the clear, to the north of the Sugar-pot, about a quarter of a mile from the shaft previously sunk. No sluicing having been done on this claim, the lead has not been exposed, and at a depth of 65 ft. there was no sign of it, the sinking so far being through gravel which is making water, but Mr. Fogarty, who was in charge of the work, estimated that 20 ft. to 30 ft. further would put them on to the auriferous lead. The site of the shaft is fairly well in line with the general trend of the lead, but is not far from the mouth of a large gully which runs back into the range, and, in view of the fact that 65 ft. of sinking had not shown the lead, it is just possible that on account of its varying width the shaft may not be on the lead at all, or that it may have been scoured out in the neighbourhood of the gully to a considerable depth and its place filled by the gravel deposit, in which case it is really impossible to calculate the depth the shaft would have to be sunk before coming on to the lead. The estimated cost of sinking the shaft 500 ft. (not including cost of plant) is about £1,300. As the matter is of great importance to the district the following offer has been made: That four or five of the owners of claims at Matakānui should unite on equal terms to put down a prospecting shaft on a site to be mutually agreed upon. When the site has been selected, and the amount to be contributed by each claim-holder or company determined, the proposals of the association to be again submitted to the Government with an estimate of the total cost of the works to be undertaken, and upon receipt of this information a further report will be obtained from an officer of

the Mines Department, with a view of determining the extent to which the Government should assist the association in the construction of the shaft.

AN application has been received from Mr. Arthur A. Crapp for a license to mine for coal under a portion of the bed of Tauranga Harbour lying between his property at Omokoroa and Matakana Island, distant about a mile and a half from the Omokoroa Point. Mr. Crapp states that there is an extensive bed of lignite running across the two points above named, and he is desirous of boring for coal under the seam of lignite, which extends from the mouth of Te Puna River to Matakana Island, a distance of three miles. The seam is stated to be about 10 chains wide where it crops up close to the Omokoroa Point. Mr. Crapp has been informed that there is no objection to the issue of a license, on condition that the public shall have full use of all navigable waters, and that the provisions of "The Coal-mines Act, 1891," are complied with.

THE increased interest taken in mining investments is shown by the fact that Skinner's "Mining Manual," when first published in 1887, dealt with only 830 companies, while the 1897 edition contains notices of 3,216 companies, of which 1,012 were registered since the previous issue of the Manual. During the past two years 1,818 companies, with a subscribed capital of over £200,000,000, were placed on the London market.

THE export of gold from the Australian Colonies and New Zealand during the first six months of the present year was over £8,000,000, or more than it was for the twelve months of any of the preceding three years, when the quantity exported was—

1896	...	...	2,375,948 oz.
1895	...	...	2,365,165 oz.
1894	...	...	2,206,724 oz.

Commenting on these figures, the *British Australasian* remarks: "Evidently the newly-formed Australasian Chamber of Mines and the West Australian Chamber will find plenty of work to do in keeping investors at Home supplied with all the latest facts and figures concerning the developments on the various fields."

THE second edition of "The Cyanide Process of Gold Extraction," by Mr. James Park, F.G.S., late Director of the Thames School of Mines, is exhausted, and the third edition is now in the printer's hands.

SOME record shaft-sinking has been accomplished at Reefton. The Globe B shaft was started with a dozen men on the 9th November, 1896, and on the 21st August, 1897, was down to a depth of 945 ft. Experienced mining men in the district have expressed their opinion that this breaks the record for shaft-sinking so far as the Australasian Colonies are concerned. Perhaps the *Australian Mining Standard*, which is generally regarded as a good authority in such matters, will cast a little further light on this point.

DURING the month of May Mr. James Coutts and his assistant, Mr. Thomas Ryan, visited fifty-six mines on the Hauraki Goldfields, as well as most of the coal-mines in the Waikato, Whangarei, and Kawakawa districts. The visits were necessarily hurried, and partly of an introductory character, but a great deal of ground was covered. The work of inspection has been since systematically carried on. Generally speaking, the mines visited are worked in an efficient manner, and the ventilation in nearly every case was found to be all that could be desired. The English companies are doing excellent work, but on what may be termed outside claims the number of men employed on the large area of ground held is limited, and rather disappointing. In order to secure punctuality in getting in returns from batteries, &c., by the 5th of the month, in accordance with Part V. of "The Mining Act, 1891," circulars were sent out to every mine-manager or owner of gold-saving appliances to have their returns in not later than that date.

THE Western Australian Government have placed a contract with a firm in Pittsburg, Pennsylvania, U.S.A., for 100 miles of 12 in. lap-welded steel pipe, and over 300 miles of 30 in. steel-riveted pipe, to be used for the water-supply of the goldfields in the Coolgardie district. Over 20,000 tons of material will be used in the construction of the pipes, and by the time it reaches Western Australia the cost will exceed £400,000.

THE *Mining Journal* (London), commenting upon Mr. Morison's paper, read before the North-east Coast (England) Institution of Engineers and Shipbuilders (a portion of which, together with an illustration of the stamp-mill, was reproduced in the first issue of the RECORD), thinks that Mr. Morison's new stamp has the prospect of a successful career before it, and all the more because he has not attempted any alterations in the ordinary battery-box, which, "simple-looking though it may be, represents the results of a

good deal of experiment, a good deal of thought, and even more of close, careful observation, and is not so very easily improved upon." To the alterations made in the battery-box the *Journal* attributes the failure of other stamp-mills that were at one time expected to supersede it.

THE report for the first year of the London and New Zealand Exploration Company shows a net profit of £17,927, out of which an interim dividend of 10 per cent. was paid in October, 1896, leaving a balance of £10,155 to be carried forward to the next year's working account. The report refers to the formation of the New Zealand Talisman Gold-mining Company (Karangahake) on satisfactory terms. Numerous properties were submitted and examined by the Exploration Company's engineers, and several of them had been, on their recommendation, taken under option. The directors recorded their satisfaction with the energy and discrimination shown by their representatives in New Zealand.

A MINING EXHIBITION is to be held in Coolgardie, Western Australia, next year. The Government of that colony are subsidising it to the extent of £5,000, in addition to a grant of land which is stated to be worth £10,000 at the present time, and the Coolgardie Council are to contribute £1,000 towards it. The idea originated with the Mine-managers' Institute of Coolgardie, whose members were impressed with the necessity for some practical exposition of the working of the many classes of machinery brought under their notice for ore-reducing and gold-saving. British, American, and colonial manufacturers have promised their assistance, and committees are being formed in all the principal cities on the Western Australian goldfields to further the project. Designs have been accepted for a main building of stone, without annexes, to cost £3,000. The opening has been fixed for April, 1898, and the duration of the exhibition will be at least three, and perhaps six, months. On its close the land, buildings, and profits that may accrue will be vested in trustees appointed by the Government, Chambers of Mines, and Mine-managers' Institute of Western Australia, and will form the nucleus of a School of Mines and Technical Institute for the goldfields. The general managers of railways and shipping companies of the various colonies have intimated their willingness to grant liberal concessions in the carriage of exhibits. At the request of manufacturers, it is not intended, as at first proposed, to confine the

exhibits solely to mining and gold-saving machinery: it is to be made more comprehensive and international. The Hon. the Minister of Mines, New Zealand, has been asked to allow his name to be added to the list of members of the Executive Commission, and he has acceded to the request.

A REWARD of £100 has been asked for by Mr. William Delaney, of Ashburton, who claims to have been the discoverer of the "Barewood Reefs," Otago, in 1889. In his application Mr. Delaney stated that the reefs were nine miles from any other claim, and that 180 miners were employed in working them at the time he wrote. An officer to whom the application was referred has ascertained that the "Barewood Reef" is in part of the University Reserve brought under the operation of the Mines Act by Proclamation in *Gazette* No. 25 of the 8th May, 1890, page 517, but the reef was discovered some years before, and worked or prospected under arrangements made by the miners with the Council of the University. There were no means of ascertaining who first discovered the reef, but Mr. William Delaney was one of several persons who applied at the Warden's office, Dunedin, on the 20th September, 1890, for licensed holdings on that reef; that he was granted a licensed holding over Section 4, Block 6, and Section 7, Block 7, Nenthorn (Barewood Reef), on the 21st January, 1891; that the license was cancelled on the 6th September, 1895; that he paid two half-years' rents, amounting to £29; and that there are arrears amounting to £58. Some work has been done, more or less continuously, since September, 1890, and at the present time there are two companies prospecting by sinking shafts and driving a low-level tunnel. About forty men are employed on the reef, and so far as could be ascertained that was as large a number as had ever been actually engaged in mining on that line of reef. It will probably take twelve or eighteen months for the companies now prospecting the reef to decide whether it can be made remunerative. Mr. Delaney has received an intimation in accordance with the terms of the report.

DURING the parliamentary session of 1895 the Chairman of the Goldfields and Mines Committee reported to the House of Representatives: "The Committee, having had under consideration the frequency with which petitions are addressed to your honourable House year after year by claimants for rewards for the alleged discovery of goldfields, have instructed me to report that they have agreed to the following resolution, namely: 'That, in the opinion of this Com-

mittee, no application for rewards for gold discoveries said to have been made more than five years before the presentation of any petition referring to or claiming under the same be considered now nor in the future by the Goldfields Committee.'"

At a recent meeting of the Waihi School of Mines the Instructor's report stated that fifty-six students had joined and taken up 114 classes, or an average of two subjects for each student, and that the sum of £53 10s. had been received in fees during four weeks, including £3 10s. from members' subscriptions. The secretary reported having received from the Hon. the Minister of Mines a parcel of specimens representing minerals from various parts of the world.

THE Auckland foundries and merchants must have had a busy time this year, judging from the quantity of machinery supplied by one firm (Messrs. John Chambers and Son) to various mining companies in the Cape Colville Peninsula. The machinery included six small prospecting plants, with engines and boilers, for shaft-sinking, two or three being fitted up preparatory to the erection of much larger and permanent plants; four air-compressing plants; three complete electric-light installations (Waihi, Woodstock, and Crown Mines), and a fourth in readiness for the Waihi Company's new battery at Owharoa.

DURING the year ending the 31st March, 1897, the quantity of ore crushed in the Ohinemuri district was 66,985 tons, yielding 148,626 oz. of bullion, averaging 2 oz. 4 dwt. 9 gr. The total quantity crushed for a period of ten years was 263,826 tons, which gave a yield of 538,046 oz., the average per ton being 2 oz. 0 dwt. 18 gr. From the 1st April, 1878, to the 31st March, 1897, the batteries at the Thames crushed 850,152 tons, for 769,281 oz., averaging 18 dwt. 2 gr. per ton. At Coromandel the crushings from the 1st April, 1880, to the 31st March, 1897, totalled 143,310 tons, yielding 208,080 oz., averaging 1 oz. 13 dwt. 18 gr. per ton. At Te Aroha 50,708 tons were crushed from the 1st April, 1883, to the 31st March, 1897, for a yield of 51,448 oz., averaging 1 oz. 0 dwt. 7 gr. per ton. The total quantity crushed in these districts (and 3 tons from the Great Barrier, which yielded 219 oz.) from the 1st April, 1878, to the 31st March, 1897, was 1,287,999 tons, which yielded 1,567,075 oz., or an average of 1 oz. 4 dwt. 8 gr. per ton.

IN addition to the large battery power at present existing in the Hauraki Mining District, there are

350 stamps in course of erection — 220 in the Ohinemuri fields, 110 at the Thames, and 20 at Coromandel. It is therefore expected that the present increased output from the mines will have to be materially added to in the course of a few months, so as to keep the batteries going at full speed.

THE total amount of gold duty credited to the local bodies in the North Island for the past year was £9,901 17s. 4d., of which Ohinemuri received the largest share, £5,740 3s. 2d.; Coromandel, £2,874 13s. 10d.; Thames County, £664 5s. 2d.; Thames Borough, £617 3s. 3d.; Piako, £5 9s. 11d.; and Whangarei, 2s.

THE price paid for gold ranges in New Zealand from a maximum of about £4 2s. in Otago and Westland to £2 8s. in Ohinemuri. In Otago the price generally varies from £3 10s. 6d. to £3 18s.; in Westland, £3 18s. to £3 19s.; in Nelson, Westport, and Inangahua, £3 13s. to £4 1s. 10d.; in the Hauraki Goldfields, £2 8s. to £3 9s.

MINISTERS OF MINES.

ALTHOUGH the Mines Department was called into existence on the 1st April, 1878, with the late Mr. Oliver Wakefield as Under-Secretary for Goldfields, it was not until July, 1879, that a separate portfolio in the Ministry was allotted to it. The following are the names of the gentlemen who held office as Minister of Mines, and the periods of their appointments:—

HON. WILLIAM GISBORNE.—5th July to 8th October, 1879. Grey Ministry.

HON. WILLIAM ROLLESTON.—15th December, 1880, to 16th August, 1884. Hall-Whitaker-Atkinson Ministries.

HON. JAMES MACANDREW.—16th August to 28th August, 1884. Stout-Vogel Ministry.

HON. WILLIAM JAMES MUDIE LARNACH, C.M.G.—5th January, 1885, to 8th October, 1887. Stout-Vogel Ministry.

HON. GEORGE FREDERICK RICHARDSON.—8th October, 1887, to 17th October, 1889. Atkinson Ministry.

HON. THOMAS FERGUS.—17th October, 1889, to 24th January, 1891. Atkinson Ministry.

RIGHT HON. RICHARD JOHN SEDDON, P.C.—24th January, 1891, to 6th September, 1893. Balance-Seddon Ministries.

HON. ALFRED JEROME CADMAN.—6th September, 1893, till present date. Seddon Ministry.

BATTERY AND GOLD RETURNS.

NELSON, WEST COAST, AND OTAGO DISTRICTS.

Battery Returns for July, 1897.

Name of Company, Mine, or Battery.	Locality of Mine.	Quartz or Tailings.	Number of Tons crushed or treated.	Yield of Amalgam.	Yield of Retorted Gold.
Alpine Extended* Tributars	Lyell ..	Quartz ..	105	Oz. dwt. gr. 396 0 0	Oz. dwt. gr. 189 8 0
Tyrconnel	" ..	" ..	34	" ..	34 0 0
Keep-it-Dark	Reefton ..	" ..	314	337 0 0	116 7 0
Sir Francis Drake ..	Merrijigs ..	" ..	230	" ..	102 11 0
Big River†	Big River ..	Tailings ..	290	" ..	65 0 0
Achilles	Bullendale ..	Quartz ..	550	" ..	485 0 0
Westralia and N.Z. Gold Explorers ..	Macetown ..	" ..	170	162 15 0	58 15 0
Westralia and N.Z. Gold Explorers ..	" ..	Tailings ..	22½	" ..	52 0 0
Morning Star	Preservation Inlet	Quartz ..	272	573 0 0	2,342 0 0

* United Alpine and Lyell Creek Extended Companies amalgamated under the style of "The Alpine Extended Quartz-mining Company."

† And gold-slimes unsmelted, 35 oz.

Battery Returns for August, 1897.

Name of Company, Mine, or Battery.	Locality of Mine.	Quartz or Tailings.	Number of Tons crushed or treated.	Yield of Amalgam.	Yield of Retorted Gold.
Alpine Extended	Lyell ..	Quartz ..	115	Oz. dwt. gr. ..	Oz. dwt. gr. 70 0 0
A1, No. 1 Tributars	" ..	Tailings ..	26	60 0 0	27 0 0
A1, No. 2 Tributars	Merrijigs ..	Quartz ..	8½	" ..	13 5 0
Keep-it-Dark*	" ..	" ..	14	" ..	45 5 0
Big River	Reefton ..	" ..	230	146 0 0	46 18 0
Achilles	Big River ..	" ..	551	" ..	96 14 0
Glenrock Consolidated	Bullendale ..	Tailings ..	619	" ..	358 0 0
Morning Star†	Macetown ..	Quartz ..	510	" ..	211 0 0
	Preservation Inlet	" ..	375	" ..	803 16 0

* From top-plates only.

† Including two months' tailings from ten stampers.

HAURAKI GOLDFIELDS.

Battery Returns for July, 1897.

Name of Company, Mine, or Battery.	Locality of Mine.	Ore or Tailings.	Number of Tons crushed or treated.	Yield of Gold or Bullion.	Value.
Tararu Creek	Thames ..	Ore ..	Tons. cwt. Lb. 331 0 ..	Oz. dwt. gr. 73 10 0	£ s. d.
"	" ..	Tailings ..	400 0 ..	217 6 0	432 6 0
Waiotahi	" ..	Ore ..	145 0 ..	195 1 0	537 4 0
Claremont	" ..	" ..	" .. 12	13 5 0	35 8 10
May Queen Extended	" ..	" ..	95 10 12	146 4 0	381 14 2
Hauraki Anchor	" ..	" ..	42 0 ..	35 18 0	96 0 7
Manning's	" ..	" ..	" ..	15 9 0	41 6 7
May Queen-Hauraki	" ..	" ..	71 10 ..	60 10 0	167 17 10
School of Mines	" ..	" ..	4 14 69	20 9 3	54 14 5
Judd's Tailings Plant	" ..	Tailings ..	390 0 ..	93 0 0	239 9 6
Kuranui-Caledonian	" ..	Ore ..	550 0 140	330 11 0	876 2 6
New Alburnia	" ..	" ..	501 0 ..	507 2 0	1,360 14 4
Waihi-Silverton	Waihi ..	" ..	1,000 0 ..	725 0 0	1,399 0 0
Waihi	" ..	" ..	3,120 0 ..	11,512 0 0	11,667 15 3
Waitekauri	Waitekauri ..	" ..	1,841 0 ..	4,689 0 0	5,462 2 1
New Zealand Crown Mines	Karangahake ..	" ..	1,473 0 ..	2,352 0 0	4,081 5 11
Woodstock	" ..	" ..	1,030 0 ..	5,696 7 0	3,947 2 0
New Zealand Talisman	" ..	" ..	700 0 ..	60 0 0	" ..
Triumph	Coromandel ..	" ..	120 0 ..	8 10 0	" ..
Scotty's Hauraki	" ..	" ..	10 0 ..	3 19 0	11 9 1
Hauraki	" ..	" ..	357 0 121	549 0 0	1,604 0 0
Hauraki North	" ..	" ..	70 0 ..	34 11 0	" ..
Success	" ..	" ..	39 0 45	191 11 0	570 3 6
Tokatea Consols	" ..	" ..	13 0 ..	48 9 0	145 7 0
Kapai-Vermont	Kuaotunu ..	" ..	260 0 ..	238 0 0	446 0 0
Mariposa	" ..	" ..	424 0 ..	34 5 0	" ..
"	" ..	Tailings ..	295 0 ..	43 5 0	193 15 0
G. Fraser and Sons.. ..	Auckland ..	Ore ..	" .. 42	2 14 7	7 12 6

Battery Returns for August, 1897.

Name of Company, Mine, or Battery.	Locality of Mine.	Ore or Tailings.	Number of Tons crushed or treated.		Yield of Gold or Bullion.	Value.
			Tons. cwt.	Lb.	Oz. dwt. gr.	£ s. d.
Kuranni-Caledonian	Thames	Ore	435 0	..	117 17 0	477 4 7
May Queen Extended	"	"	75 0	90	185 9 0	496 1 7
School of Mines	"	"	..	660	19 0 0	50 16 6
Hauraki Anchor	"	"	23 0	..	15 6 0	40 18 6
Claremont	"	"	..	..	8 16 0	23 10 9
Waiotahi	"	"	130 0	..	186 11 0	509 18 0
Tararu Creek	"	"	319 0	..	57 0 0	169 16 3
"	"	"	350 0	..	204 0 0	110 10 0
New Zealand Crown Mines ..	Karangahake ..	Tailings ..	1,567 0	..	2,394 0 0	4,163 0 0
Woodstock	"	Ore	1,015 0	..	5,417 5 0	2,758 19 5
New Zealand Talisman	"	"	1,008 0	..	4,632 8 0	3,915 0 0
Waihi	Waihi	"	3,120 0	..	11,315 0 0	11,757 1 10
Waihi-Silverton	"	"	840 0	..	556 0 0	1,108 0 0
Hauraki	Coromandel ..	"	300 0	285	529 5 0	1,607 11 1
Success	"	"	5 0	30	129 12 0	372 1 6
Royal Oak*	"	"	34 0	3,706	2,608 0 0	6,621 5 6

* Tokatea of Hauraki amalgamated.

OTAGO DREDGING RETURNS.

THE following dredging returns for the months of July and August have been furnished by the secretary of the Dunedin Stock-brokers' Association:—

JULY.		AUGUST.	
Dredge.	Yield in Ounces.	Dredge.	Yield in Ounces.
Clyde	428	Clyde	745
Dunedin	148½	Dunedin	164
Enterprise	59½	Enterprise	106½
Golden Treasure	244	Golden Treasure	218½
Otago	121½	Otago	96
Upper Waipori	124½	Upper Waipori	157
Jutland Flat.. ..	129½	Jutland Flat.. ..	20¾
Ettrick	89¾	Ettrick	93½
Golden Gate	49	Golden Gate.. ..	66½
Roxburgh	24	Roxburgh	64
Sew Hoy Big Beach	31½	Sew Hoy Big Beach	100¾
Buller (Westport)	63¾	Buller (Westport)	97
Molyneux Hydraulic	84	Golden Run	100
		Edina	10
Totals	1,596¾	Totals	2,039¾

These returns do not, however, by any means represent the gold obtained by dredging in Otago, as many of the dredges, such as the Electric No. 2, near Cromwell, which has had some sensational yields, are owned by private parties, who do not make their returns public. The Electric No. 2 dredge is stated to have obtained gold to the value of £5,000 from a piece of ground equal to the length of her hull and 30 ft. wide, and the Ngapara Company 180 oz. for one week's work.

The Clyde Dredging Company have secured gold to the value of £10,000 since November, 1896. Two dividends of £10 and £5 were declared on eighty shares in July, and one of £5 in August. The Golden Treasure declared a dividend of 2s. 6d. per share in July, and 5s. in August; Enterprise, 1s. in July; Otago, 1s. in August; Ettrick, 1s. 6d. in August; and Jutland Flat, 6d. in August.

AUSTRALASIAN CHAMBER OF MINES.

A DEPUTATION from the Incorporated Australasian Chamber of Mines, London, waited upon the Australasian Premiers on Saturday, the 2nd July, in order to bring before their notice the formation of the Australasian Chamber of Mines, and to invite the sympathy and support of the various Governments represented by the Premiers. Mr. Frederick Dutton, chairman of the Broken Hill Proprietary (N.S.W.) and Mount Lyell (Tasmania) Companies, said there were many ways in which sympathy and support might be extended, but one which he wished particularly to point out was that the Chamber should be placed in communication with the Mines Departments of the several colonies, and should be furnished from time to time with all the official information which might be at their disposal. It was of importance that the Chamber should be furnished with all Acts of Parliament relating to mining matters, all regulations passed under those Acts, and all official reports of the departments with reference to the mining industry. When all these documents were received at that centre in the City of London they might be focussed and indexed and arranged, and would be valuable as a means of information to all who might come to the Chamber and have access to them. The Right Hon. Mr. Seddon, who followed the Premier of Victoria, said:—

"I may say, on behalf of New Zealand, we shall be prepared to furnish direct from the Government the fullest information at our command—and it will be interesting for you to know that we have established a Mining Bureau—and from the different mining communities and the Chambers of Mines in our colony

any information that comes to the Government. It is then supervised by our own Government experts and officers, and that information shall come very direct from the Government to you here at Home. (Applause.) I am pleased myself to find, although it is rather late in the day, that you are now determined to establish a Chamber of Mines at the head centre where most of the capital comes from. Had it been done sooner I am sure the British investors would have greatly benefited. However, it is not too late yet. Speaking, of course, in respect of the legislation and the administration of our mines, I would say this: that it is not information alone that is wanted, but there has been information supplied which has been very inaccurate. On those two grounds the establishment of a Chamber of Mines in London will be of immense benefit to the mining industry of the world. I may say with Sir George Turner that, in respect to the legislation of the whole of the colonies, and particularly of my own colony, we have always endeavoured to give to the investor and to the capitalist security for his money. We have at the same time had to carefully guard against that which has at times eventuated in our colony—namely, giving security to a person who puts in four pegs, he sells his interest, and then the other party goes further afield, and there is nothing *bonâ fide* behind the whole thing. These wild-cat speculators prevent legitimate investment. If we had no labour conditions the legitimate investor would have no protection at all. It is in the interest of the *bonâ fide* investor that these laws are necessary. I wish to say, to prevent a false impression, that I do not know a case where there has been a cancellation of a title of any mining property owing to non-compliance with mining conditions where there has been at all a reasonable expenditure or *bonâ fide* occupation. [Sir George Turner: That does not refer to all the colonies.] I am speaking of New Zealand. I do not know a single case. I would say again—which is necessary, I think, to be said—a word as regards renewals. As you know, the holding of mining rights is fixed by statute for a number of years, and I do not know another case, and I have been thirty years practically and theoretically connected with mining, where the Government or the Warden have refused renewal, so that you may say that wherever the conditions have been complied with there is permanent occupation. These are two points which want to be cleared up, and I take this early opportunity of doing it. We want to have capital directed into legitimate channels, which is as much to our interest as yours, and to prevent wild-cat flotations, because it is that in the long run which destroys the industry.”

KAURI TIMBER COMPANY'S LANDS.

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THE negotiations which have been going on for some time past between the Government and the Kauri Timber Company for the surrender of auriferous areas held by the company have been satisfactorily concluded, the following agreement having been entered into between the Crown and the directors of the company:—

This Deed, made the seventeenth day of May, one thousand eight hundred and ninety-seven, between the Kauri Timber Company (Limited), of Auckland and elsewhere in the Colony of New Zealand (hereinafter called “the Company”), of the one part, and Her Majesty the Queen of the other part. Whereas Her Majesty has from time to time acquired from the Native or other owners certain lands in the North Island of the said colony, subject, nevertheless, to certain outstanding leases or licenses granted to or acquired by the Company from the said owners prior to such acquisition as aforesaid: And whereas by virtue of such acquisition all the rights of the said owners as grantors of such leases or licenses are now vested in Her Majesty: And whereas it has been agreed between the parties hereto that the said leases or licenses and all extensions thereof granted under “The Kaimarama Land Act, 1890,” shall in the manner, to the extent, and subject to the conditions hereinafter appearing be surrendered from time to time by the Company as to such of the lands comprised therein as for the time being are timberless or denuded of timber, and that each such surrender shall be effected under section 29 of “The Mining Act Amendment Act, 1896”: Now this deed witnesseth that it is hereby agreed by and between the parties hereto as follows:—

1. These presents shall apply in every case where lands in the North Island have been acquired by Her Majesty for an estate in fee-simple subject to any outstanding estate or interest possessed by the Company therein by virtue of any lease or license granted by the Native or other owners of such lands prior to the acquisition thereof as aforesaid by Her Majesty, and also to all extensions thereof granted under “The Kaimarama Land Act, 1890,” but shall not apply to any new lease or extended lease granted under “The Tairua Land Act, 1893.”

2. The Company, at the request of the Minister of Mines of the said colony, and on receipt from him of not less than three months' previous written notice so to do, will from time to time, according to the tenor of such notice, surrender any of the aforesaid leases or licenses as to the whole or any portion of the timberless or timber-denuded lands comprised therein: Provided that each such notice shall specify with reasonable particularity the land as to which any lease or license is to be surrendered, and also that such notice shall avail only in respect of lands that are timberless or denuded of timber: Provided, further, that such notice shall be deemed to have been duly given in respect of all the timberless or timber-denuded land on the following blocks: that is to say, Tairua, Kapowai, Karo, Puketui, and Ounuora.

3. The Company shall be entitled to compensation for all land surrendered under these presents, and the amount thereof shall in each case be assessed on the basis of the actual cash value of the surrendered land to

the Company at the time of the surrender, and shall be paid to the Company when the surrender is completed: Provided that no compensation shall be payable in respect of the auriferous or argentiferous value of any such land.

4. The amount of the compensation shall in each case be determined if necessary by arbitration, either under "The Arbitration Act, 1890," or otherwise as may be agreed, and in every case the costs of arbitration shall be equally divided between Her Majesty and the Company.

5. All moneys payable by Her Majesty to the Company in respect of any such compensation shall be payable out of moneys appropriated by Parliament: Provided that if and in so far as is allowed by law the Company shall have the option to take timber land to the value of such compensation in lieu of cash.

6. For the purposes and subject to the provisions of section 53 of "The Mining Act Amendment Act, 1896," it is hereby declared that upon the surrender of any land under the provisions of these presents the water and other rights then held and enjoyed by the Company in respect thereof by virtue of any such lease or license as aforesaid shall, notwithstanding such surrender, be deemed to be reserved to the Company in so far as may be necessary to enable the Company to cut, float, and remove timber upon any land which shall not then have been surrendered by it, and to float and remove any such timber therefrom, upon, over, and by means of the land so surrendered as fully and effectually as the Company could lawfully do by virtue of any such lease or license as aforesaid immediately prior to the making of and every such surrender.

7. All mining claims and other mining privileges granted by the Warden under the aforesaid section 53 in respect of any surrendered land that shall be granted subject to the express conditions to be indorsed on any license issued by the Company shall not be liable for damage of any kind that may be caused to the owner of any such claim or mining privilege in the reasonable exercise by the company of such reserved rights. And also that in every case where such reserved rights include the right to stop, dam, divert, or use water or water-channels, such right shall, when required to be exercised for the purpose of floating and removing timber as aforesaid, be exercisable in priority to any water rights granted under the aforesaid section 53 to the owner of any claim or mining privilege. And also that if the licensee diverts any water from any stream to which such priority applies he shall erect and maintain at the point of diversion such wing-dam or other construction or contrivance as will enable the Company by means thereof to stop such diversion whenever it requires the water.

8. In every case where the land to be surrendered is less than the whole of the lands comprised in the lease or license, the following special conditions shall apply:—

(a.) The expenses of any survey that may be necessary for the purposes of the surrender shall be borne by Her Majesty.

(b.) In order to lessen the risk of damage by fire or otherwise to the timber on the land that is not to be surrendered, the boundaries of the land to be surrendered shall be so adjusted as to leave a sufficient belt of timberless land not exceeding twenty chains in width unsundered.

(c.) A duly proportionate abatement of the rent (if

any) payable in respect of the unsundered land shall be made for the residue of the term of the lease or license.

Since the above agreement was entered into, a further arrangement has been come to by which disputes and the consequent expenses in connection with the Arbitration Court are abolished, the company having agreed with the Government to accept 1s. per acre for all lands surrendered under this agreement.

THE CYANIDE PATENT RIGHTS.

AN agreement has been entered into between the Hon. the Minister of Mines and the Cassel Gold-extracting Company (Limited) by which the company agree to sell the patent rights within the colony to the Government for £15,000, to be paid after the passing of a Bill ratifying the agreement, to be submitted to Parliament within ten days after the commencement of the ensuing session. The following is the full text of the agreement:—

Memorandum of Agreement, made this fourth day of September, one thousand eight hundred and ninety-seven, between the Cassel Gold-extracting Company (Limited) (hereinafter, with its assigns, included in the expression, "the said Company"), of the one part, and the Honourable Alfred Jerome Cadman, Minister of Mines, acting on behalf of the Government of the Colony of New Zealand (hereinafter, with his successors in office, included in the expression, "the Minister"), of the other part. Whereas the said Company is the beneficial owner of certain inventions and processes (commonly known as the "MacArthur-Forrest Processes") for the extraction of gold and silver from ores and other compounds, and also of certain patents in respect thereof (including two New Zealand patents numbered respectively 2775 and 3296), and of the rights and privileges thereby conferred (all of which inventions, processes, patent rights, and privileges, together with the full benefit and advantage of all such amendments, improvements, and additions thereto as from time to time are directly or indirectly made or acquired by the said Company under their existing letters patent, whether in New Zealand or elsewhere, are hereinafter included in the expression, "the said patent rights"); subject, nevertheless, to the full and free right and license heretofore granted by the said Company to and now possessed by each of the four companies following, that is to say,—

- (a.) The Waihi Gold-mining Company (Limited),
- (b.) The Waitekaui Gold-mining Company (Limited),
- (c.) The Union Waihi Gold-mining Company (Limited), and
- (d.) The New Zealand Crown Mines Company (Limited),—

to use and employ the said patent rights in its mines: And whereas the said Company has warranted as the basis of this agreement that except as hereinbefore mentioned there is no company or person entitled under any contract or license with or from the said Company to use the said patent rights in the Colony of

New Zealand: And whereas proceedings for the revocation of the said New Zealand patents were recently instituted in the Supreme Court of New Zealand by the Attorney-General, and are now depending therein, but have by consent been stayed for the purposes of these presents: Now these presents witness that it is hereby agreed by and between the parties hereto as follows:—

1. Subject to the provisions hereinafter contained, the said Company sells, and the Minister, on behalf of the Government, purchases from the said Company, the said patent rights within the Colony of New Zealand, but not elsewhere, for the sum of fifteen thousand pounds (£15,000), to be paid forthwith on the passing of the Bill referred to in paragraph numbered six of this agreement.

2. The date of the purchase shall be deemed to be the twentieth day of August, one thousand eight hundred and ninety-seven.

3. The said Company reserves to itself the right to recover all debts and to enforce all claims which at the date of the purchase were existing in respect of the use or infringement of the said patent rights by any person or company, and shall account to the Government for all moneys received by the said Company in respect of such use subsequent to that date; but nothing herein contained shall be construed as implying any obligation upon the said Company to recover or take any step to recover any moneys accrued or accruing due to the said Company for the use of the said patent rights after the date of the purchase.

4. The said Company shall not increase the present rate of charges for the use of the said patent rights, nor make any contract or engagement in respect thereof, without the previous consent in writing of the Minister.

5. The purchase is subject and without prejudice to the hereinbefore-recited right and license of each of the companies aforesaid to use and employ the said patent rights in its mines.

6. The purchase is subject to the approval of Parliament by Bill to be introduced by the Government within ten days after the commencement of the now next ensuing session.

7. The Bill may provide that the said patent rights purchased under this agreement may be surrendered, revoked, assigned, or otherwise dealt with in such manner as Parliament thinks fit.

8. The purchase hereinbefore expressed shall be deemed to lapse and be cancelled if the Bill is rejected, or if it fails to pass within twenty-one days after its introduction, or such extended period as the said Company, by its attorney, solicitor, or agent, from time to time consents to.

9. In the event of the said purchase lapsing and being cancelled as aforesaid, all parties shall be deemed to be forthwith restored to their rights and position as existing immediately prior to the twentieth day of August, one thousand eight hundred and ninety-seven; but in the meantime the aforesaid proceedings shall remain stayed.

10. In the event of the purchase being approved by Parliament, the Company shall, at the request of the Government, do and execute whatever acts and instruments the Minister may require for the purpose of effectuating this agreement and disposing of the said proceedings in such manner as he thinks fit, on the terms of each side paying its own costs.

It is the intention of the Government to allow the

use of the cyanide process on the goldfields, and to make a small charge for the privilege, based on a sliding scale according to the value of the ore treated. When all expenses incurred by the Government have been recouped, the cyanide process will then be free to all who are engaged in gold-mining in this colony.

PROGRESS OF MINING IN NEW ZEALAND.*

[By Mr. HENRY A. GORDON, Assoc. M. Inst. C.E., M. Amer. Inst. M.E., F.G.S., President of the New Zealand Institute of Mining Engineers.]

THE progress made in the gold-mining industry since gold was first discovered in the colony has been comparatively slow; indeed, at the present day, on some of our fields miners still adhere to the use of antiquated appliances in working their claims, and it is only by actual demonstration that one can convince them that any improvement in their method of working can be effected.

The first intimation of the likelihood of gold being found in New Zealand of which there is any record was given by Mr. Hargreaves, who was the first discoverer of gold in New South Wales. On his arrival in this country from California, prior to leaving for Sydney, he expressed his belief that gold would be found in New Zealand, as the topographical features and geological formation of the country reminded him of California. Between the years 1838 and 1840, it is said that the late Mr. George White, of Whitianga, found ore on the ranges opposite Te Aroha, from which a small ingot of bullion was produced. This ingot was afterwards in the possession of Messrs. Sandiman, Willis, and Co., and was sent Home by Mr. George Graham, of the Royal Engineers, in 1850.

The first discovery of gold occurred, however, some time after Mr. Hargreaves's departure. It was made by our respected townsman, Mr. Charles Ring, in 1852, in the bed of a creek which still bears his name at Coromandel, the gold found in the bed of this creek being intermixed with quartz.

The first goldfield which really proved to give remunerative returns for working was opened in the Collingwood district in 1857, but it was not until about the middle of 1861, when the discovery of gold in the alluvial drifts was made by Mr. Gabriel Read, in Gabriel's Gully in Otago, that any considerable attention was given to gold-mining in the colony. Thousands of people then flocked to our shores, the

* Inaugural address delivered at the first meeting of the New Zealand Institute of Mining Engineers, held at the Chamber of Mines, Auckland, on the 12th July, 1897.

mining population rapidly increased, and there was a corresponding increase in the yield of gold.

The total value of gold produced in the colony during the first four years of the gold-mining industry—that is to say, up to the commencement of the year 1860—was £138,898, while at the end of 1861 the value of the bullion produced during that year was £751,873, while during the succeeding twelve years it was £27,180,714, equal to an average of £2,248,393 per annum. Up to this time only about three million pounds of that amount came from quartz workings.

Quartz-mining was first commenced in Coromandel in 1858, but up to the end of 1861 the yield of gold from this branch of the industry was comparatively small, the value being only £1,232.

The next discoveries of auriferous quartz were made at Skipper's, in Otago, in 1862, at Thames in 1867, and at Reefton, on the West Coast, in 1872. Since then the yield of gold from quartz-mining has shown a steady increase, whilst that from the alluvial workings has on the whole decreased.

The workings in alluvial ground were carried on, in the early stage, in a very primitive manner. All the outfit a miner required consisted of a pick and shovel, a tin dish, a rocker, and a tub. The last soon got replaced by a long-tom and sluice-box wherever a small stream of water could be obtained for washing purposes, and in the case of a long-tom a small hand-pump made out of four boards of sawn timber was used to lift the tail-water to wash the auriferous drift, thereby using the same water over and over again until it became too thick to be utilised.

The alluvial workings were confined to the beds of small streams and gullies where the material had been concentrated by the action of water, all the light portions being carried away with the stream, leaving the denser particles behind. The workings were all of a very shallow depth, and it required very little skill in those days to work the auriferous gravel drifts so as to make them remunerative.

As time went on the shallow ground got exhausted, and attention had to be given to deeper workings; in the case of terraces containing a great depth of auriferous gravel drifts, the gold being distributed through a great thickness of gravel, it could not be profitably extracted by the methods hitherto used, and this led to the construction of water-races, and the terraces being worked by hydraulic and also ground sluicing, which, although a great improvement on the former system of working, was only carried on in a primitive manner. The boxes used were only about 12 in. wide, and in

very few instances were they more than 24 ft. long, using a very small stream of water. Gradually these sluices were enlarged, more water was used, and larger quantities of material operated on.

In more recent years low-lying valleys, which hitherto had not been prospected on account of the quantity of water there was to contend with, and of the fact that the ground was not sufficiently rich to admit of its being mined in the ordinary way by means of shafts and pumping machinery, have been successfully worked by means of hydraulic elevators and dredges. The latter are now applied successfully to work low-lying ground where the depth of the auriferous material does not exceed 40 ft., a thing which could not have been done by any other means. Hydraulic elevators are now also used to lift the material successfully to the height of 20 ft. for every 100 ft. head of water used on the elevator, as can be seen at Kildare Hill, at St. Bathans, in Mr. John Ewing's claim.

Both the hydraulic elevator and the dredges applied to mining have undergone, and are still undergoing, considerable modifications in design, not only to admit of their operation on larger quantities of material, but also to effect a more complete saving of the gold. There is ample scope for engineers in respect of the planning and designing of other methods for the intelligent working of the alluvial drifts. It was only about two years ago that elevators were constructed for lifting the tailings from the sluice-boxes of dredges, which now stack and deposit the washed material and stones some distance from the sterns of the barges or pontoons on which the dredging and gold-saving appliances are placed. This has, to a certain extent, been the means of dredging being made to give fair returns. Formerly the stones were deposited directly under the stern of the barge, and choked it to such an extent that it could not be moved.

In the quartz-mining industry, too, great changes have taken place. The early crushing appliances in the Australian Colonies were Chilian mills and stamps with wooden stems. The first of the batteries were constructed on the design of the old Cornish stampers, having a cast-iron hollow drum, through which the axle was placed, keyed or wedged on to a box at each end. In the drum there were a number of holes cast, into which the tappets were driven with wooden wedges. The wooden stems were from 6 in. to 8 in. in diameter, having either a wrought- or a cast-iron blade made fast to the stems and projecting out through it 5 in. to come in contact with the tappets of the drum as it revolved.

This drum system was replaced by a shaft with wrought-iron double cams, which lifted the stamps by having a slot cut out in the wooden stems for the cams to pass through as they revolved. After the cams wore away the wood a filling-piece of hard wood was put into the top of the slot, and held fast by means of wooden dowels put through the stem and the filling-piece. This system was a considerable improvement on the cast-iron drums with tappets, but nevertheless the friction was considerable. All the stamps had square heads, and they used to wear very unevenly, as only very inferior castings could be got from the local foundries in the early days.

The next step was the adoption of revolving stamps with round heads, but when these were first introduced the heads were all of one piece, and they were used until worn down within 2 in. of the bottom of the core-hole where the end of the stem was driven in with soft wooden wedges. The discs of tappets were made of cast iron, which very soon wore away to such an extent that even the stamps would not revolve, thus causing an uneven wearing of the heads, as in the case of the square stamps.

Since that time there has been quite a revolution in the design of stamp batteries, and other mills have been introduced, such as the Pryan, Globe and Krom roller-mills, the Huntington edge-runner mill, the Marsden crusher and pulveriser, the Dodge pulveriser and granulator, the Otis and Krupp ball mills. None of these, so far, has superseded the stamps for general crushing purposes, especially for hard ore. At the same time my impression is that the stamp batteries will yet be replaced by mills which will be found more economical to work.

What is required is a mill to crush the ore to a uniform fineness, especially when it is to be treated with cyanide solution. This cannot be obtained by the use of stamps, as before the whole of the crushed ore will pass through the screens a large percentage is pulverised to an impalpable powder, producing slimes which are difficult to treat. The Otis and Krupp mills crush the ore to a far more uniform fineness, as it passes through the screens as soon as it is pulverised, but so far these mills have not been found so economical to work, especially where the ore is of a hard character. At the same time they require less power to do an amount of work equal to that of stamps, but the wear-and-tear is considerably greater. No doubt improvements will yet be made in them, and possibly in the future they will be found to answer better than the stamp battery when dry-crushing is carried on.

Looking theoretically at the designs of the dif-

ferent mills used, my own impression is that a mill of somewhat similar design to that of the Krom rolls would be the best and most economical pulveriser if so designed that the rolls would wear uniformly. The weak point of these at the present time is that the tires tend to become grooved towards the centre, and when this takes place their use as fine crushers is barred.

The improvements in mills are not confined to pulverising the ore; a considerable advance has been made in appliances for gold-saving. The number of amalgamating-machines that have been used since auriferous and argentiferous ores have been worked cannot be enumerated and described in the time at my disposal on this occasion. Suffice it to state that, with all the amalgamating appliances that have hitherto been used in connection with the crushing-mills in this colony, it can safely be asserted that in the North Island not more than 50 per cent. of the gold in the ore has been extracted; indeed, if regular assays of the ore had been made at each of the mines since they were opened, it is questionable if the value extracted would have been found to average 40 per cent. In the South Island the gold is of a different character; it is not nearly so finely disseminated through the quartz, and one would naturally expect to get a higher percentage than from the North Island ore, but it is questionable if more than 60 per cent. of the average value has been saved.

The greatest improvement yet made in gold-saving, when the ore is of a suitable character for treatment, is the use of the cyanide process, but it is only ore fairly free from base metals that is suitable for treatment by this method. When the ore contains sulphides of antimony, copper, and zinc only a small percentage of the precious metals can be recovered by the use of cyanide solution. Ever since the process was first introduced into the colony considerable improvements have been made in this method of treating the ore. Experiments have to be made at every mine to ascertain the best and most economical strength of solution to be used, and the time occupied in the treatment. The excessive royalty charged by the patentees for the use of this process has, however, prevented mining companies from using it as extensively as they otherwise would have done, and this has led to a bitter feeling that such a patent right should never have been granted on the terms set forth in the patentees' application. Experiments are still being conducted and further discoveries made in regard to the precipitation of gold from cyanide solution. In a paper recently read before the Chemical and Metallurgical Society of South Africa

by L. Ehrmann the latter claims to get a better result in the precipitation of gold by using zinc threads or shavings in a hot solution of about 175° Fahr. He also shows that better results can be got when the zinc shavings are slightly coated with a thin film of copper, the solution used as giving the best results being an ammonia-cupric solution. His laboratory experiments show that by using a hot solution a better precipitation can be obtained in two hours than in twenty-four hours by cold precipitation. This mode of precipitation, however, has not yet been tested on such a scale as to justify one in expressing a decided opinion whether it could be profitably used or not. One thing is certain—namely, that if the Cassel Company's patent rights are upset far more experiments will be made with the use of cyanide solution in the treatment of auriferous and argentiferous ores, and no doubt great improvements in its application will be the outcome of further investigations.

Having thus reviewed the progress made in the gold-mining industry in this colony, the next question to consider is the best course to adopt to benefit that industry in all its branches.

This is a matter for such an Institute as ours to investigate, and from an exchange of ideas amongst its members many practical results will accrue.

It may be asked, "What is a mining engineer? and what training does he require to be conversant with all the branches of his profession?" This is a subject deserving of the highest consideration, not only by the members of the profession, but also by those who embark their capital in mining ventures.

At no period in the history of mining in New Zealand has there been more urgent necessity for the employment of competent mining engineers. During the past eighteen months we have passed through a mining boom, when mining properties have been placed on foreign markets in order to obtain sufficient capital to work them, and it will be most disastrous for the colony if the people who have invested their money in these ventures do not get a fair interest returned upon their outlay. The success or failure of these ventures depends largely on the correctness of the reports furnished by the mining engineers who are selected to examine the properties, and also on their practical and general knowledge in conducting mining operations and in the treatment of the various classes of auriferous and argentiferous ores which are found in this colony.

It is therefore essentially necessary that a mining engineer should have, in addition to the practical experience in working mines, a technical training, and a

knowledge of the sciences on which mining is based, which embrace geology, mineralogy, chemistry, metallurgy, mechanics, and mine-surveying.

In order to acquire a grasp of these subjects it is at least necessary to have a knowledge of mathematics, and, while the higher branches are of great value as a system of mental training, the more elementary portions of algebra, geometry, and trigonometry are quite indispensable. Without these a mining engineer cannot possibly grasp the different sciences which he is expected to be acquainted with; indeed, mathematics may be said to be the foundation on which the principles of engineering are based.

While it is essential to have a technical education, it must not be supposed that this is the only requirement. Mining cannot be termed a science, but it is an industrial art or occupation for purely economic purposes. A mining engineer's success is judged from a financial aspect, and economy is the criterion by which he must stand or fall. Unless he can carry on large operations more economically and get better results than a man without any technical education, then his training has been of no value either to himself or his employers. Let me be clearly understood in making this assertion. Mining is not a science, albeit the mode of conducting the operations in connection with mining is based on scientific principles. The treatment of the ore after it leaves the mine is a subject which requires considerable scientific knowledge in order to secure the highest percentage of its valuable contents with the greatest possible economy. A mining engineer may have the highest theoretical attainments, and yet prove a failure from his lack of practical qualities for conducting mining operations. A better description of a mining engineer could not be given than that of Mr. Knopp, a mining engineer on the Pacific Slope of North America, who was engaged by the Government of British Columbia to report on the mines in that province. In his report to the Minister, as taken from the blue-books of that colony, the following advice is given: "If you wish to employ a mine-manager get one from the Pacific Slope who has cost a company half a million dollars. That man may make slight mistakes again, but other companies have paid for him gaining his experience. The manager of a mine should be able to run an engine, know how to run a mill in all its branches, know when each stamp is doing its duty, detect a loose mortar-bolt, cut out any timber for a shaft or drive or elsewhere, sharpen a pick or drill; in fact, he must be a miniature encyclopædia."

A knowledge of geology is necessary in order that he may understand the formation of the different

rocks met with in mining, and how faults occur, and the effect these have on the displacement of lodes. In different parts of the world we know that certain metals are found in certain formations, and although these formations are not the same in different countries where the same metals and minerals are found, yet they have a geological relation to each other which enables a geologist to form an idea as to the metals and minerals likely to be obtained in the different rocks in the country under his examination.

Mineralogy and crystallography also deserve more attention than is generally given to them. A general knowledge of these sciences enables the engineer to recognise at once the mineral he meets with, while his knowledge of chemistry assists him in determining its component parts and its value. Chemistry also enables him to determine the composition of gases met with in carrying on mining operations, and suggests the best mode of diluting the air in the mine so as to be the least injurious to the workmen employed therein.

An engineer has, in the constant practice of his profession, to make or get assays made of the different ores in the mine under his superintendence. It is essentially necessary that he should have a theoretical knowledge of chemistry, and have been sufficiently long in a laboratory to become proficient in qualitative and quantitative analysis, and also in assaying. Without a knowledge of chemistry he cannot understand the principles of metallurgy, and the reasons why different classes of ore require different modes of treatment.

There is no subject at the present day that demands more attention than the intelligent treatment of ores, whereby the metals and minerals they contain can be extracted at the lowest cost. This applies with great force to the auriferous and argentiferous ores found in the North Island of this colony, some of which may be classed as the most refractory to treat that are found in any part of the world. Some of our ores have hitherto baffled metallurgists both here and in Europe who have experimented with a view to their economic treatment. Although containing a large percentage of gold and silver, the ores are frequently so intermixed with blende, galena, sulphides of antimony and copper that the extraction of the precious metals is too costly a process at the present time to allow of its remunerative working. Hence we may truly say that, with all the technical training we have acquired, we are only in our infancy in regard to the economic treatment of the various ores.

A knowledge of surveying and levelling is also indispensable to a mining engineer. He should be

able to make accurate underground surveys, as well as surveys of water-races, &c., and understand the principles of construction of all works in connection with every branch of mining, and the machinery and appliances connected therewith. It is absolutely impossible to acquire the knowledge which a mining engineer requires from a mere theoretical training. He must have had practical experience in the different systems of working mines, and this can be got neither from lectures nor from literature. Mining must be learnt in a mine, and, even although a man may have a good practical knowledge of quartz-mining, he may have very little knowledge of deep alluvial mining, where there are treacherous drifts to traverse, requiring an entirely different system of timbering from that employed in quartz-mines. Hydraulic mining, although apparently simple, requires the man who superintends operations to have a good deal of practical experience to carry on the operations successfully with the greatest economy. The great desideratum of the profession is to have men qualified in every particular to carry on mining operations successfully at a minimum cost.

The education of a mining engineer in following his profession is continually proceeding; he is learning every year of his life something new; scarcely a day passes without bringing with it some fresh subject for investigation. The number of questions he is supposed to be able to solve is really perplexing, as well as amazing. In the daily routine of life no doubt many of you have extraordinary questions put to you to solve, such as, "Are the goldfields on the wane?" "Do you think rich bonanzas will be got at deep levels?" "Is it safe to invest in this or that claim?" "What would you recommend me to do?"

These are questions which a mining engineer is expected to answer every day of his life, unless he choose to shut himself up so that nobody can see him. Now, one may ask, why should he be expected to answer such questions as these? It is not always good policy to decline to give an answer, and a man may be sometimes at his wits' end to give such a suitable reply. It would, however, be generally wise to reply, "No one can with any certainty tell what lies in the bowels of the earth. Why ask such questions as these? The days of necromancers, astrologers, and witchcraft are gone; the divining rod is a fallacy; science has not yet reached the point at which it can prove by actual demonstration that by sinking so many feet in this or that place a person will be recompensed for his labour." A mining engineer or geologist may say there are

indications which would lead one to suppose that a certain metal or mineral is likely to be found in such formations, but unless a lode is outcropping on the surface or the country-rock stained with certain minerals he cannot give an accurate opinion. Any one who pretends that he can do so is not endowed with much wisdom; he rushes in where angels fear to tread.

If one had only to reply to the question, "Is it your opinion that the goldfields of New Zealand are on the wane?" answer might be made that, as far as the shallow alluvial workings are concerned, they appear to be becoming exhausted; but deep mining, both in alluvial and quartz, is only in its infancy.

Placer or hydraulic mining has gone through a good many phases, and considerable improvements have been effected from time to time; but there is still plenty of room for further improvements to be made before we can say that our system is even tolerably perfect. The quantity of gold which is daily lost—or it may be said wasted—is something appalling, in both alluvial and quartz workings.

No doubt the loss of gold depends greatly on its character. If the gold be fine and flaky, it can be safely asserted that not more than 50 per cent. of it is recovered by the present methods adopted in alluvial workings. The present system is to rush the material through sluices regardless of such considerations. It is simply impossible to save fine gold in sluice-boxes where there is a great body of material to be dealt with. The boxes are, in most instances, far too narrow for the quantity of material passed through them. If the gold is to be saved the gravel or washed drift requires to go over the riffles in a thin film in such a manner that all the material rolls on the top of the riffles or false bottom. In every sluice there should be a number of under-currents for the fine material to pass over, and wherever these under-currents are a grizzly requires to be placed in the main sluice, so as to separate the fine material from the coarse. These under-current boxes should be paved with small stones, having bars across the table at stated intervals to prevent the stones shifting, and also to prevent quicksilver getting out of the compartment; that is, the under-current table requires to be divided into several compartments, and each of these compartments pitched with stones, and quicksilver should be poured into the interstices. These tables also require to be of considerable width, to allow of the material going over them in a thin film. In long sluices there may be seven or eight of these under-current tables, each of them requiring to be about 20 ft. wide and, say, about 25 ft. long.

In making provision for under-current tables it has to be borne in mind that in the construction of sluices a considerable fall is required to provide for these tables. The ordinary fall for a main sluice is from $\frac{1}{2}$ in. to $\frac{3}{4}$ in. to the foot, and it requires an extra 2 ft. at every place at which an under-current table is constructed, as the table requires a fall of about 1 in. to the foot, and the water from the table should return into the main sluice.

Where the gold is very fine, as on the sea-beaches, it is found that either plush or blanketing on tables acts very well for saving it. On the sea-beaches at Charleston the miners use tables covered with copper plate coated with quicksilver in place of plush, which was formerly used, and from what can be learnt from their experience in the use of these plates they answer very well. The material on the sea-beaches is extremely fine sand.

These tables could not be used for the class of material coming through a grizzly, which is coarse gravel, and would soon wear the coating of quicksilver off the copper-plates.

Wherever the gold is deposited through a great depth of gravel it is generally of a scaly character, and that is the class of gold which is most difficult to save. The cause of the gold being of this character consists in the fact that the material has in many instances been carried long distances with water, whereby the gold was ground up by stones and boulders rolling down the stream. The whole of the auriferous gravel has come from a denudation of the mountains and terraces; large slips and material carried by glacial action have all contributed towards the immense quantity of auriferous drifts which are now found on low terraces and in valleys, the latter in many cases being old lake-basins.

The configuration of the country at the present time is totally different from what it was at the time the auriferous drifts were originally deposited. A great many of these drifts were formed in the Miocene age, when the whole country was a plain compared with what it is at the present day. At that time large rivers existed and flowed in a totally different direction from their present course. Large ancient river-beds can now be traced across the dividing-range between the east and west coasts of the Middle Island, and to all appearance these rivers flowed from north to south. The one that can be best followed commences south of the Miconui River, goes over Mount Greenland, passes through Ross, going northwards between Kanieri and Kanieri Lake, flowing through Humphrey's Gully, Waimea, Maori Creek, Maori Gully, No Town, Nelson Creek,

Orwell Creek, Noble's, Blackwater, Anthony's, Soldier's, and Reefton. The same gravels are again seen on the Hope Saddle, and on Spooner's Range, and finally this river must have discharged its waters into the sea at Blind Bay, near Nelson.

New Zealand is only a portion of a large continent which once existed, and has since disappeared. Nothing now remains excepting that a few rocks mark the position of the tops of the high mountains before the subsidence took place. Dr. Hochstetter, one of our earliest geologists, who examined this country, took special notice of this fact. He calls attention to the abrupt declivity on the west coast of the Middle Island, and points out that at some previous period high mountains existed to the westward of Hokitika, now covered with the waters of the ocean. He also states that these mountains were fully sixty miles to the seaward of the present shoreline.

The only place where this has been carried on is at Ross, on the west coast of the Middle Island. At that place we find the ground has been elevated and depressed at different periods. A fossil skeleton of a whale was found in blue lias formation by Mr. John Gow while he was constructing a water-race from Donnelly's Creek to Ross Flat; the place where the skeleton was found is two miles inland from the ocean-beach, at an elevation of 300 ft. above the level of the sea. Then, again, about three-quarters of a mile from where the fossil remains were discovered, a river-bed can be seen in the deep-sea level workings in Ross Flat, which are 240 ft. below the present sea-level.

The alluvial workings in Ross Flat are unique so far as the alluvial drifts of this colony are concerned. There are eight different layers or beds of auriferous wash-drift, one layer above another, and from 20 ft. to 30 ft. of barren material between each. The upper layers consist of a concentration of the more recent drifts, while the lower bed is composed of concentrated gravels belonging to the Upper Miocene or Lower Pliocene age. The same class of gravel-drift as that which forms the upper layers can be got on the inland ranges, while that on the lower bed can only be got close along the coast-line. At this place the lowest auriferous layer rests on what is termed by the miners "Maori" or "Old-man bottom," which is held by many to be non-auriferous; but in reality it is the material from which the richest alluvial deposits of gold have been derived. During my connection with the mines at Ross coarse specks of gold were found in this formation when constructing the trench-levels from the pump-shaft.

The greater portion of the gold found on the ocean-beaches also came from a concentration of the gravel forming its bottom, and a great deal of it came from the land which has now disappeared and is covered with the waters of the ocean.

No doubt a certain quantity of gold is brought down by the present rivers and deposited on the sea-beach, but its quantity is small in comparison to that which came from the concentration of the older gravels by the ancient rivers, where now the layers of concentrated older gravels alone mark the place where an immense volume of water formerly flowed.

In reference to our quartz workings, we have auriferous reefs in different formations in the North Island. We have very rich lodes in the decomposed andesite; and in a conversation with Mr. McKay, the Government Geologist, he assured me that during his explorations last year on the Hauraki Peninsula he came across quartz reefs in rhyolite. None of these has as yet come under my notice.

In the Middle Island we have payable reefs in the Carboniferous, Devonian, and Silurian slates, and in the Archæan schists, where it is difficult to estimate precisely to what age the rocks belong, as there are no fossils or remains of life to indicate the period when these schists were formed. Suffice it to say that millions of years must have passed away before the earth was in a fit state for the lower orders of life to exist—that is, reckoning the thickness of the different stratified deposits which make up the crust of the earth, and assuming the average rate of deposition or denudation of the surface. This is set down by different writers as 1 ft. in 3,000 years, a figure based upon actual calculations of the average quantity of solid matter carried down by the Mississippi and other great rivers. The Tertiary period alone must have lasted for several millions of years.

It may be asked, "What has the age of the earth to do with mining engineers?" It is, however, a question in which they are deeply interested.

In order to distinguish the different periods or transition stages in the age of the earth we must have some knowledge of the different forms of animal and vegetable life which have existed. As already shown, the lodes occur in different formations, and have been formed at different periods in the world's history, and, although we may at the present day have only a very limited means of arriving at a hypothesis as to the formation of lodes and mineral veins, by the exchange of ideas and following up step by step what comes within our own observation in connection with different metals and minerals, we may hope to build up a theory which will stand the closest

practical investigation. The formation and manner of occurrence of lodes are subjects for an engineer to investigate. Many theories have already been advanced, and, although some of them appear to be most reasonable at first sight, when they come to be closely analysed none of them has been found to meet all the conditions in which the different ore-bodies are found.

We know that there is a certain increase in the temperature as we attain depth below the surface of the earth, and if this increment were to continue in the same ratio we would soon find that water could not exist—that it would change its form. The heat would be so intense as to convert liquid into a gas, and my impression is that the heat of the earth has a great deal to do with the distribution of the different metals in lodes and the leaching-out of the silica from the rocks to fill the different fractures and fissures that exist in the earth's crust.

The average increase in temperature varies greatly in different parts of the world. The deepest bore-hole on record measures 6,571 ft.; it was put down at Paruschowitz, Upper Silesia. This hole was commenced 12 in. in diameter on top and was $2\frac{3}{4}$ in. diameter at the bottom. The boring-rods, which were all of steel, had a weight of 30,155 lb.; these broke, 4,500 ft. of them falling to the bottom, and got jammed under part of the tubing, which caused the operations to be suspended. The temperature of the surface was 53° Fahr., and at a depth of 6,571 ft. it was 157° , being equal to an average increase of 1° Fahr. for every 63 ft. in depth. This indicates that at a depth of seven miles below the surface the temperature would produce a dull red heat on iron, which would not admit of water penetrating the strata at this depth; steam would be forced into every crevice, and the heated waters, charged with various metals and with silica in solution, would be forced up from below into all the open fractures and fissures existing in the earth's crust. This is likely to be accomplished by both lateral and ascensional secretions; the silica being deposited and crystallizing would widen the fissures and cause the formation of lodes. This subject is, however, at the present day, comparatively hypothetical.

If we were to assume the average increase of the temperature of the earth to be 1° Fahr. for every 63 ft. in depth, then water would commence to boil at a depth of 2 miles 44 chains, and the different metals would commence to melt at the following depths, namely: Mercury at 39 chains; tin at 5 miles 22 chains; bismuth at 5 miles 73 chains; lead at 7 miles 25 chains; zinc at 8 miles 63 chains; antimony at 9 miles 54 chains; brass at 21 miles 70 chains;

silver at 22 miles 28 chains; copper at 23 miles 22 chains; gold at 24 miles 40 chains; iron at 33 miles 20 chains; and platinum at 36 miles 60 chains. The increase of temperature at 1° Fahr. for every 63 ft. in depth would not apply to many parts of New Zealand, as we know that there is boiling water at or near the surface in the Hot Lakes District, while at Ohaeawai we find mercury distilled from the ore by the heat of the earth near the surface, and its fumes condensed when coming in contact with the cold atmosphere.

We know very little about the earth on which we reside. If its temperature were to increase in the same ratio as we know it does for the small distance through which its crust has been pierced, the heat at the centre would be far more than our intellects are capable of comprehending—viz., $335,238^{\circ}$ Fahr.—such a temperature as we have no conception of, and more especially when we consider the earth a solid body. It is not reasonable to suppose that the heat of the earth continues to increase in the same proportion as it does in the upper portion of its crust. The natural laws teach us that the greater the heat the more expansive all metallic substances become, and yet, although we know the specific gravity of the earth to be about 5.6—that is, its weight is 5.6 times heavier than water—we find the crust, as far as we are able to pierce it, has a specific gravity of only about 2.6.

This is an interesting question, as to whether the amount of compression due to gravitation is sufficient to make the same materials which form the crust of the earth so dense as to account for the specific gravity of the whole mass, or whether its interior is composed of a larger percentage of metals than that found near the surface.

Geology and palæontology have in the present century opened a vast field of research. The historical period only takes us back at the most about 7,600 years, which is a mere fraction of time in comparison to the age of the earth. The oldest and most authentic information we have is from the hieroglyphic figures found on the monuments and bas-reliefs in Egypt and Chaldea, showing that these were places of great antiquity, and make it a reasonable inference that civilisation was far advanced in Egypt prior to Menes, the first Pharaoh or king who united the different provinces into one empire. The authorities who have devoted their lives to the study of hieroglyphic writings do not agree as to the date at which Menes lived. Boeck makes it about 7,600 years; Unger, 7,510 years; Mariette, 6,901 years; Brugsch, 6,352 years; Lauth, 6,055 years; Lepsius, 5,790 years; and Bunsen, 5,521 years ago.

Although these authorities differ as to the date at which this potentate reigned, one thing is certain—namely, that there was a large population in the land prior to Menes's accession. Old, however, as these historical records are, they embrace a mere fraction of time in comparison to the different geological periods through which the earth has passed. When we see the fossil remains of the fauna and flora which existed millions of years ago we are lost in the annals of antiquity. We have to proceed slowly, step by step, to arrive at a reasonable understanding of the changes that have taken place since the earth assumed a fit condition for the existence of animal and vegetable life.

The geologists of the present day give the strata a thickness of about twenty-five miles. Of this about 30,000 ft. belong to the Laurentian or Archæan period, being the oldest stratified deposit. This was changed by heat and slow crystallization, so that whatever fossil remains there may have been are obliterated. The Cambrian age is put down at 10,000 ft., the Silurian at 22,000 ft., and the Devonian, Carboniferous, and Permian at 42,000 ft. The whole of these belong to the Primary or Palæozoic period. In the Upper Silurian there is abundant proof of life, consisting of crustacea, shell-fish, and true fish, while the Devonian and Carboniferous periods afford ample proof of the abundance of life, both fauna and flora.

The second great division includes the Triassic, Jurassic, and Cretaceous systems, which have a thickness of about 15,000 ft. This was the age of reptiles and carnivorous flying lizards, such as the pterodactyle. The few mammalian remains that are found in this formation are of the marsupial or lowest type.

The next great division is the Tertiary or Cainozoic, which embraces the Eocene, Miocene, and Pliocene, which have a total thickness of about 13,000 ft. It is in this period that we get a clear natural record of the changes that have taken place. It was in this age that the present forms of animal life were first inaugurated.

In the early Eocene we find the first trace of the horse, the eohippus, an animal with five toes and tubular-toothed mammal about the size of a fox. In the Upper Eocene it is replaced by the orohippus, in which the first toe had disappeared. In the Miocene it is again replaced by the mesohippus, about the size of a large Newfoundland dog. In the Upper Miocene it is again replaced by the miohippus, which gives place to the protohippus, about the size of an ass. In the Middle Pliocene we have the pliohippus, which has lost all the rudimentary toes, and in the Upper Pliocene we have the true horse. Not only has the horse gone through different progressive stages, but

we also have proof of the dog and the bear having the same ancestors. In the early Eocene we have the amphicyon and hyærnartus, the former being more dog than bear, and the latter more bear than dog. The more recent period is the Quaternary, which embraces the Pleistocene and prehistoric age. The former includes the older valley gravels, raised beaches, and glacial deposits, while in the latter we have the younger raised beaches, kitchen-middens, lake dwellings, &c.

By means of geology we are able to glean from the work of nature authentic records of the changes that have taken place millions of years before man made his appearance, or at least assumed his present form. With a knowledge of geology we are able to ascertain the age of the different rocks and gravels; we are also able to tell from the gravel in the alluvial whether it is a fluvial, lacustrine, or glacial deposit. When we see the stones and pebbles nicely rounded we infer that the deposit was caused by the action of flowing water; and, again, when we see the stones and pebbles worn flat in circular and other shaped discs we infer that they have been subjected to the action of waves on a beach; while the stones in glacial material are more sharp and angular. Thus, with a knowledge of geology, a mining engineer is the better able to trace an auriferous deposit to its source.

It may be said that New Zealand is a country in which great changes have taken place. Portions of it have been elevated and depressed at different periods. It is a country abounding in metals and minerals, but the stages through which it has passed have left it full of faults and dislocations, greatly affecting the continuity of ore deposits, and making it difficult to follow them. It is a country in which mining engineers are required to carry on mining in the future, and they have ample scope for distinguishing themselves in their profession.

It is essential that a mining engineer should have a knowledge of the geological structure of the rocks in the district where he is to conduct mining operations, and that he should make a study of the ore deposits—a subject which is too often lost sight of by those engaged in mining.

An engineer may develop a mining property successfully by simply following the ore-bodies, guided by empirical rules which experience has taught him, without regard to the phenomenal appearance of the country-rock, its structure, condition, or the probable origin, character, and formation of the ore deposits; but in carrying on his operations it is to be expected that unless he carefully studies this subject he will be liable to make mistakes which may involve a large useless expenditure.

Notwithstanding that the study of geology sprang from empirical observations of those engaged in mining, quarrying, &c., it has made more relative progress in the classification of rocks and their relative ages than in the study of ore deposits, this being due, no doubt, in a great measure to the perplexity of the subject and the lack of scientific zeal or perception on the part of those who are actually engaged in conducting mining operations. With reference to this subject, Mr. Samuel Franklin Emmons, of the United States Geological Survey, observes: "The phenomena to be investigated must be studied in the underground workings of mines, in which not only is a very small area opened to observation compared with the surface phenomena on which other geological reasonings are mainly based, but they are not in their nature as permanent as in the latter, and soon become obscured by decay or entirely inaccessible. But, while the attainable facts are thus relatively meagre, they have not all been available to the student, for the reason that those practically engaged in mining are too often content with noting those facts alone which have an immediate practical bearing, and have neglected to put on record those of merely theoretical interest, which, nevertheless, if carefully observed might afford a basis for scientific generalisations of great economic importance."

In concluding my remarks, I would say that it is to be hoped that every member of our Institute will bring before us any matter that may strike him as being of practical interest to the profession, and that in his daily avocation, in visiting and examining mines, he will note all the peculiarities and structural conditions of the ore deposits, and communicate his views by means of a paper for discussion by our members.

By this means we hope to eventually arrive at a satisfactory solution of the genesis of ore deposits. It is only by an accumulation of a large number of scientific observations based on correct geological studies that we can attain this end, and we must look to those who are practically conducting the operations in mines for these contributions, since they alone have the opportunity of daily observing the constantly changing phenomena which ore deposits present. We do not expect each member to write lengthy and minute descriptions, but merely to give concise information as to the manner of occurrence, conditions, &c.

It has to be borne in mind that "Unity is strength." If we only partially succeed in accomplishing the end we have in view, we shall have done our duty as citizens in the land of our adoption, and shall have sustained the principle of onward progress, the characteristic of the nation to which we belong.

BRITISH INVESTMENTS IN NEW ZEALAND MINES.

THE *British Australasian* of the 22nd July supplies the following particulars of investments in New Zealand mines by British capitalists:—

Name.	Locality in which Operations are being carried on.	Share Capital.	British Office.
Anglo-Continental Gold Syndicate (Limited)	General	£ 100,000	Austinfriars, London.
Aroha Gold-mines	Aroha	100,000	30 and 31, St. Swithin's Lane.
Achilles Goldfields	Otago	100,000	11, Poultry, E.C.
Blagrove's Freehold Gold-mining Company	Coromandel	62,500	97, Dashwood House, E.C.
Blue Spur and Gabriel's Gully Consolidated Gold Company	Otago	120,000	6, Great St. Helen's.
Britannia (Hauraki) Gold-mining Company	Coromandel	100,000	34 and 36, Gresham Street, E.C.
Collingwood Goldfields	Collingwood, Golden Bay	150,000	46, Queen Victoria Street, E.C.
Colville Company	Coromandel	7,500	7, Drapers' Gardens, E.C.
Consolidated Goldfields of New Zealand	Reefton	225,000	30, St. Swithin's Lane.
Coromandel Exploration Syndicate	General	2,000	6, Great St. Helen's.
Cromwell Gold Company	"	100,000	54, Old Broad Street, E.C.
Dolcoath Gold-mining Company (Hauraki Peninsula, New Zealand)	Coromandel	150,000	142 and 143, Palmerston Buildings, E.C.
Dual Syndicate	General	10,000	3, Clement's Lane, E.C.
East Hauraki Gold-mining	Coromandel	100,000	Finsbury House.
Ethel Reef Gold-mining Company	Te Aroha	120,000	Dashwood House, E.C.
Fame and Fortune	Thames	50,000	110, Cannon Street.
Glenrock Consolidated (Limited)	General	225,000	3, Queen Street, E.C.
Gloucester Gold-mining Company	Thames	120,000	Throgmorton House, E.C.
Golden Lead of Hauraki	Coromandel	100,000	Moorgate Court, E.C.
Golden Pah (Hauraki)	"	62,500	97, Dashwood House, E.C.
Goldfields of Hauraki Prospecting Syndicate	General	3,000	53, New Broad Street, E.C.
Goldfields of New Zealand	"	100,000	13, St. Helen's Place, E.C.
Gold Trust of New Zealand	"	100	4, Great Winchester Street, E.C.
Grey Consolidated	Grey	200,000	15 and 16, George Street, S.W.
Hauraki Gold-mining Company	Coromandel	40,000	97, Dashwood House, E.C.
Hauraki Associated Gold Reefs	"	100,000	Winchester House.
Hauraki South Gold-mining Company	"	90,000	7, Great Winchester Street.
Hauraki (Auckland) Goldfields Syndicate	General	10,000	30, Basinghall Street, E.C.
Hauraki East	"	150,000	6 and 7, Grocer's Hall Court, E.C.
Hauraki Golden Bay Mines	"	150,000	8, Old Jewry, E.C.
Hauraki New	Coromandel	150,000	3, Princes Street.
Hikutaia Gold Syndicate	Ohinemuri	15,000	Suffolk House, E.C.
Inkerman Combined Gold-mines	General	200,000	15 and 16, George Street, S.W.

BRITISH INVESTMENTS IN NEW ZEALAND MINES—continued.

Name.	Locality in which Operations are being carried on.	Share Capital.	British Office.
		£	
Irene (Hauraki) Gold-mine	Kuaotunu	80,000	Dashwood House.
Island Block Gold-mining Company	Otago	60,000	4, Lombard Court, E.C.
Kapai-Vermont Gold-mining Company	Kuaotunu	150,000	1, St. Helen's Place, E.C.
Kapanga Gold-mining Company	Coromandel	250,000	97, Dashwood House.
Kathleen Crown	"	75,000	Dashwood House.
Kathleen Gold-mine	"	75,000	"
Kauri Freehold Gold Estates	General	250,000	6, Drapers' Gardens.
Key of Komata	Ohinemuri	100,000	34 and 36, Gresham Street, E.C.
Komata Queen	"	75,000	Dashwood House.
Komata Reefs Gold-mining Company	"	50,000	97, Dashwood House.
Kuranui Caledonian Gold-mining Company	Thames	175,000	20, Great Winchester Street.
London and New Zealand Exploration	General	100,000	Broad Street House.
London and New Zealand Finance Corporation	"	102,000	139, Cannon Street, E.C.
Maori Gold	Tairua	130,000	8, Old Jewry.
Maori Syndicate	General	10,000	Austinfriars Passage, E.C.
Maoriland Gold-mines	"	95,000	Dashwood House.
May Queen (Hauraki)	Thames	200,000	22, Austinfriars.
Melville's New Zealand Corporation	General	100,000	20, Great Winchester Street.
Mines Corporation of New Zealand	"	250,000	3, Princes Street.
Mines Corporation of New Zealand (Deferred)	"	5,000	
Moanataiari Gold-mining Company	Thames	200,000	110, Cannon Street.
Monowai Gold-mines	Waiomo	150,000	28, Renfield Street, Glasgow.
New Alburnia Gold-mining Company	Ohinemuri	180,000	Finsbury House, E.C.
New Hauraki Gold Properties	Thames and Coromandel	100,000	Dashwood House.
New Zealand and General Mining Syndicate	General	25,000	19A, Coleman Street.
New Zealand Crown Mines Company	Ohinemuri	200,000	30, St. Swithin's Lane, E.C.
New Zealand Exploration Company	General	125,200	30, St. Swithin's Lane.
New Zealand Goldfields	"	50,500	23, College Hill, E.C.
New Zealand Gold Share and Finance Company	"	..	3, Newman's Court, Cornhill.
New Zealand Gold Share and Finance Company (Deferred)	"	..	
New Zealand Jubilee Gold-mines	Waitekauri	125,000	20, Great Winchester St., E.C.
New Zealand Consolidated	General	50,000	15, George Street.
New Zealand Mines Trust	"	200,000	11, Abchurch Lane.
New Zealand and Western Australia Syndicate	"	50,000	Portland House.
New Zealand Gold Investment	"	5,000	11, Abchurch Lane.
New Zealand Talisman	Karangahake	150,000	65, New Broad Street.
New Zealand Venture Syndicate	General	5,000	11, Abchurch Lane.
New Zealand and Globe Exploration	"	10,050	4, Great Winchester Street, E.C.
New Zealand Broken Hills Gold-mining Company	"	300,000	13, St. Helen's Place, E.C.
New Zealand Corporation	"	100,000	3, Laurence Pountney Hill, E.C.
New Zealand Finance Syndicate	"	10,000	32, Old Jewry, E.C.
New Zealand Joint-stock and General Corporation	"	150,000	Finsbury House.
New Zealand Minerals Company	"	250,000	3, Laurence Pountney Hill, E.C.
New Zealand Pioneers	"	10,000	46, Queen Victoria Street.
Norman Proprietary Gold-mines	Waitekauri	75,000	Bloomfield House, E.C.
North Kapanga Gold-mining Company	Coromandel	60,000	54, Old Broad Street, E.C.
Ohinemuri Syndicate	Owharoa	60,000	11, Abchurch Lane.
Otago Syndicate	General	20,025	30, St. Swithin's Lane.
Peveril Gold-mines	Coromandel	80,000	27, Old Jewry.
Phoenix	General	200,000	3, Queen Street.
Preece's Point Proprietary (Hauraki)	Coromandel	100,000	Dashwood House.
Ravenscliff Mining Company	General	60,000	Winchester House.
Royal Oak of Hauraki	Coromandel	100,000	63 and 64, New Broad Street.
Royal Standard Gold-mines	Wharekairapunga	200,000	43, Threadneedle Street.
Scotty's Hauraki Gold-mining Company	Coromandel	100,000	63 and 64, New Broad Street.
Southern Star Gold-mines	"	75,000	63 and 64, New Broad Street.
Success Gold-mines	"	50,000	Dashwood House.
Taitapu Gold Estates	Nelson	175,000	9, St. Mildred's Court.
Tararu Creek Gold-mining Company	Thames	95,000	Dashwood House.
Thames Hauraki Goldfields	"	300,000	54, Old Broad Street.
Tokatea Consols	Coromandel	100,000	45 and 46, Broad Street Avenue.
Tokatea of Hauraki	"	150,000	63 and 64, New Broad Street.
Triumph Hauraki Gold-mines	"	100,000	Finsbury House.
Union Waihi Gold-mining Company	Waihi	200,000	11, Abchurch Lane.
United New Zealand Exploration	General	250,000	22, Austinfriars.
Victor Waihou Gold-mining Company	Karangahake	170,000	63 and 64, New Broad Street.
Waihi Consolidated Gold-mines	Waihi	200,000	39, Lombard Street.
Waihi Gold-mining Company	"	160,000	11, Abchurch Lane.
Waihi Grand Junction	"	150,000	18, Finsbury Circus.
Waihi Proprietary Company	General	175,000	Bishopsgate Street House, E.C.
Waihi Silverton Extended	Waihi	60,000	23, College Hill, E.C.
Waihi Gladstone	"	100,000	8, Old Jewry.
Waitaia Gold-mines	General	100,000	82, Gordon Street, Glasgow.
Waitekauri Consolidated Gold-mines	Waitekauri	120,000	Swan Chambers, E.C.
Waitekauri Central	"	65,000	63, New Broad Street.
Waitekauri Cross	"	100,000	19A, Coleman Street.
Waitekauri Extended	"	130,000	63 and 64, New Broad Street.
Waitekauri Gold	"	150,000	11, Abchurch Lane.
Waitekauri United	"	150,000	Finsbury House, E.C.
Whangamata Proprietary	Whangamata	200,000	College Hill Chambers.
Woodstock	Karangahake	150,000	6, Drapers' Gardens.